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Federal Aviation Administration

U.S. National Aviation Standard; Automatic Traffic Advisory and Resolution Service (ATARS)

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

U.S. National Aviation Standard; Automatic Traffic Advisory and Resolution Service (ATARS)

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Invitation for public comment on the Draft U.S. National Aviation Standard for the Automatic Traffic Advisory and Resolution Service (ATARS).

SUMMARY: This action presents a Draft U.S. National Aviation Standard for the Automatic Traffic Advisory and Resolution Service (ATARS). The Standard would define the system and the data link formats. It is intended to satisfy overall operational needs and assure compatibility with elements of the National Airspace System (NAS). While not regulatory the Standard may provide the basis for later rule making affecting airborne equipment.

STATUS: The FAA is continuing the development and evaluation of ATARS. To date, the performance of ATARS has not been fully validated. The purpose in publishing this draft national aviation standard is to promulgate ATARS design information, solicit public and industry comment, and to provide the widest possible exchange of information on the design of ATARS. It is anticipated that this exchange of information will materially enhance continuing development activities.

FOR FURTHER INFORMATION CONTACT: John Scardina, Aircraft Separation Assurance Branch, ARD–241, Communications and Surveillance Division, Systems Research and Development Service, Federal Aviation Administration, Department of Transportation, 400 7th Street SW, Washington, DC 20590, telephone 202–755–4995. Additional copies of this notice may be obtained from the same address.

Invitation of Public Comment

Interested persons are invited to submit written data and comments on this U.S. National Aviation Standard as they may desire. Communications should identify the notice number and be submitted in duplicate to: Director, Systems Research and Development Service, Attn: ARD–10, Federal Aviation Administration, Department of Transportation, 400 7th Street S.W., Washington, D.C. 20590, on or before May 18, 1981. Copies of comments received will be made available through ARD–10 for examination before and after the closing date for comments.

Description

The Automatic Traffic Advisory and Resolution Service is a ground-based collision avoidance system which has evolved form the earlier concept of Intermittent Positive Control (IPC) which was described by and recommended for development by the Air Traffic Control Advisory Committee in 1969. It utilizes surveillance data from the Discrete Address Beacon System (DABS) (See "U.S. National Aviation Standard for the Discrete Address Beacon System (DABS)," Appendix 1 to DOT/FAA Order 6365.1, December 9, 1980), computes traffic advisories and collision warnings using a ground computer independent of the Air Traffic Control (ATC) computer system and delivers these messages to aircraft via the DABS data link. ATARS is expected to provide both a traffic advisory and a resolution (collision avoidance) service to aircraft equipped with a DABS transponder, an altitude encoder (Mode C) and an output device for communicating ATARS advisories to the pilot.

History

This is the first time the Automatic Traffic Advisory and Resolution Service documentation in the format of a U.S. National Aviation Standard has been published for public comment.

Definition of U.S. National Standard

U.S. National Aviation Standards are system standards embodying descriptions of system characteristics. They are issued by the Administrator of the Federal Aviation Administration in accordance with Section 312(c) of the Federal Aviation Act (49 USC 1353(c)). They describe the performance characteristics (the technical parameters, tolerances and techniques) of major elements of the system to the extent necessary to assure proper operation and interface compatibility among elements of the National Airspace System (NAS). U.S. National Aviation Standards generally are limited to cooperative air-to-ground subsystems involving government owned ground equipment and private airborne equipment. They are not equipment specifications or standards pertaining to planning, programming, siting, installation, availability, reliability or maintainability.

Relationship of U.S. National Aviation Standards to Federal Aviation Regulations

U.S. National Aviation Standards issued by the Administrator in agency orders are binding only on FAA organizational elements. They establish the technical basis and description of the NAS and component subsystems. A National Aviation Standard is not a standard of general or particular applicability designed to implement or prescribe law or policy. It does not fall within the definition of "rule" contained in the Administrative Procedures Act (5 USC 551). There is no requirement that a National Aviation Standard be published as a notice of proposed rule making in the **Federal Register.** However, U.S. National Aviation Standards may serve as the basis for subsequent rule making actions. Accordingly, because of the relationship between the Standards and possible subsequent regulator actions, FAA publishes such Standards in the **Federal Register** and solicits public comment prior to their approval by the Administrator.

Issued in Washington, D.C., on March 19, 1981.

Robert W. Wedan,

Director, Systems Reserch and Development Service, Engineering and Development, Federal Aviation Administration, Department of Transportation.

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1. General

1.1 System Features

1.1.1 The function of ATARS

ATARS is an automatic traffic advisory and resolution service which uses the surveillance and the data link capability of the Discrete Address Beacon System (DABS) to provide aircraft with advisories generated by an automated ground computer system. The primary objective of ATARS is to provide separation assurance back-up to the conventional air traffic control system in order to reduce the potential for midair collisions and near-miss encounters. This objective is achieved by providing pilots with traffic advisory information on the relative location of proximate and potentially threatening aircraft and by issuing resolution advisories when a near-miss or collision is predicted. In addition, ATARS provides certain auxiliary services to enhance flight safety. These are altitude echo advisories, terrain advisories, obstruction advisories and restricted airspace advisories. All services are provided on a full time basis to equipped users within the ATARS service volume.

ATARS can provide separation assurance and auxiliary services to a potential of eight user classes. This standard defines three

ATARS user classes: Classes 0, 1 and 2. Each user class is provided all services; however, the quantity of information provided for each service differs among the classes. This permits ATARS to support a wide selection of display implementations without

transmitting a large amount of unneeded information to aircraft with limited display capabilities.

1.1.2 Rationale for the ATARS National Aviation Standard

1.1.2.1 Legal Rationale.

Under Section 312(c) of the Federal Aviation Act as amended (49 U.S.C. 1353(c)), the Department of Transportation has the responsibility for the development and operation of a common system of air traffic control and navigation of both military and civil aircraft. Explicitly, the act requires the Secretary to develop, modify, test and evaluate systems, procedures, facilities, and devices, as well as define the performance characteristics thereof, to meet the needs for safe and efficient navigation and traffic control of all civil and military aviation except for those needs of military agencies which are peculiar to air warfare and primarily of military concern. The promulgation of a national aviation standard for ATARS is in keeping with this directive, as it will permit uniformity among aircraft collision avoidance systems and promote greater efficiency and safety in aviation.

1.1.2.2 Technical Rational.

Systems selected for implementation as a result of these developments, modifications, test and evaluation efforts are described in U.S. National Aviation Standards. These are system standards embodying descriptions of system standards embodying descriptions of system characteristics. They describe technical parameters and tolerances that ensure proper operation and compatibility between elements of the National Airspace System.

1.2 Coordination of ATARS With Other Elements of the National Airspace System

ATARS is compatible with all other existing and proposed elements of the National Airspace System. The operation of ATARS will be automatically coordinated with the appropriate elements of the air traffic control system.

1.2.1 Coordination With Ground Air Traffic Control

Provisions are included in the ATARS ground equipment for automatically coordinating ATARS advisories with the air traffic control facilities responsible for the airspace in which ATARS service is being provided.

1.2.2 Coordination of ATARS With Active BCAS

Provisions are included in the ATARS airborne and ground equipment for coordination with Active BCAS. In particular, the ATARS airborne equipment must receive and reply to certain interrogations generated by Active BCAS units in other aircraft. This document provides a description of the required ATARS formats and protocols as implemented in an ATARS-only aircraft (i.e., an aircraft which is equipped for ATARS but not for BCAS service). For those airborne installations that include both ATARS and Active BCAS (i.e., all Active BCAS aircraft), the coordination of ATARS and Active BCAS is described in the Active BCAS National Aviation Standard (ref. B).

1.2.3 Coordination of ATARS With DABS

ATARS is a user of the BABS data link and is designed for full operational compatibility with DABS.

1.2.3.1 ATARS Avionics Interface with DABS Transponder.

An aircraft receiving ATARS service must carry a DABS transponder and an encoding altimeter. The DABS transponder, in addition to its surveillance function, receives data from ground ATARS equipment and other airborne BCAS units, and delivers it to the ATARS avionics. Also, airborne ATARS equipments deliver to the DABS transponder certain information resident in the ATARS avionics for transmission to ground ATARS equipment and airborne BCAS units according to protocols specified in Section 4.

1.2.3.2 Ground ATARS Equipmnt Interface with DABS Sensor.

The ground protion of ATARS consists of a DABS sensor and a computer subsystem located at the DABS sensor site. Ground DABS equipment provides ground ATARS equipment with surveillance information, with a communication link to the aircraft in the form of the DABS data link, with communication links via land lines to other DABS sensors and to the air traffic control facilities serving the airspace covered by the DABS sensor.

1.2.4 Coordination With Adjacent ATARS Sites

Provisions are included in the ATARS airborne and ground equipments for coordination of ATARS resolution advisories among adjacent ground ATARS equipment sites.

1.2.5 Compatibility With Full Capability BCAS

Full-capability BCAS (Full BCAS) is an enhanced Beacon Collision Avoidance System. It provides pilot resolution advisories both in the horizontal and vertical planes as well as proximity data through the use of modes of operation not available in Active BCAS avionic units. ATARS is designed for operational compatibility with Full BCAS.

1.3 Scope of This Standard

This document describes and standardizes those characteristics of ATARS which must be controlled to provide compatibility among components of the system and to prevent impairment of services to other users of the airspace. Specifically, it defines the data link messages, formats, and protocols to be used in transmissions among ground ATARS equipment, airborne ATARS equipment and airborne BCAS equipments. All applications of ATARS messages are standardized and no experimental or ad hoc applications should be implemented without prior approval of the Federal Aviation Administration.

1.3.1 Relationship to Other U.S. National Aviation Standards

Since ATARS interacts with other systems and subsystems which are also part of the National Airspace System, the standards governing pertinent other systems are referenced herein (1.6).

1.3.1.1 Relationship Between ATARS and DABS National Aviation Standards

ATARS adheres to all of the provisions of the DABS National Aviation Standard (ref. A). In the event of conflict between the DABS Standard and the ATARS Standard, the ATARS Standard takes lower precedence.

.3.1.2 Relationship Between ATARS and Active BCAS National Aviation Standards

In the event of conflict between the Active BCAS National Aviation Standard (ref. B) and the ATARS Standard, the ATARS Standard takes lower precedence.

1.3.2 Items Not Covered

This Standard does not prescribe the detailed technical features and capabilities of either ground or airborne ATARS equipment nor does it prescribe the minimum performance standards which must be met for operation in the National Airspace System. Other documentation will prescribe such minimum performance standards for airborne equipment. This Standard does not prescribe the details of the ground computer logic used in the generation of ATARS advisories nor does it in any way define or constrain the media, devices or formats for cockpit display of ATARS advisories.

1.4 Overall System Capability

The ATARS system consists of both ground equipment and airborne equipment. The functions of these equipments are described below.

1.4.1 Functions of Ground ATARS Equipment

The functions of the ground ATARS equipment are:

(a) Process surveillance reports on all aircraft tracked by the collocated ground DABS equipment.

(b) Maintain tracks on all targets within the ATARS service volume.

(c) Examine these tracks to detect all pairs involving at least one ATARS-equipped aircraft which require traffic or resolution advisories and detect all pairs of aircraft which require controller alerts. For aircraft pairs involving a controlled aircraft the criteria used for generation of controller alerts and threat advisories emulates the conflict alert logic resident in the terminal ATC computer system.

(d) Examine all tracks to detect ATARS-equipped aircraft which, according to the criteria of the ATARS algorithm, require terrain advisories, obstruction advisories, restricted airspace advisories or altitude echo advisories.

(e) Determine the information content of each required advisory. For resolution advisories this involves selection of the most appropriate positive, negative, or vertical speed limit resolution advisory which is consistent with previously issued resolution advisories and with resolution advisories

issued by adjacent ground ATARS equipment sites or by BCAS.

(f) Exchange data with adjacent ground ATARS sites in order to coordinate resolution advisories.

(g) Forward an appropriate set of ATARS messages to the collocated ground DABS equipment for delivery to the aircraft.

(h) Provide ATARS controller alerts to the appropriate air traffic control facilities.

1.4.2 Functions of Airborne ATARS Equipment

The functions of the airborne ATARS equipment are:

(a) Process and store ATARS information contained in the ATARS messages received via the DABS transponder.

(b) Test the compatibility of received resolution advisories with resolution advisories previously accepted from other ATARS sites or from BCAS and stored in the resolution advisory register (RAR). Accept new advisories if compatibility exists.

(c) Provide the DABS transponder with certain data inputs based upon data resident in the ATARS avionics.

(d) Generate a composite resolution advisory based upon all accepted resolution advisories.

(e) Communicate to the pilot the composite resolution advisory and selected information contained in the ATARS advisory messages.

1.5 Acronyms and Abbreviations

1.5.1 Acronyms

ASA: Aircraft Separation Assurance
ATARS: Automatic Traffic Advisory and Resolution Service
ATC: Air Traffic Control
ATCRBS: Air Traffic Control Radar Beacon System
BCAS: Beacon Collision Avoidance System
DABS: Discrete Address Beacon System
FAA: Federal Aviation Administration
RAR: Resolution Advisory Register

1.5.2 Abbreviations

FPM: feet per minute
.GE.: is greater than or equal to
.GT.: is greater than
.LE.: is less than or equal to
LSB: least significant bit
.LT.: is less than
MSB: most significant bit
NM: nautical mile

1.6 References

Reference A: "U.S. National Aviation Standard for the Discrete Address Beacon System (DABS)", Appendix 1 to DOT/ FAA Order 6365.1, December 9, 1980.

Reference B: "U.S. National Aviation Standard; Active BCAS Collision Avoidance System", Department of Transportation, Federal Aviation Administration, Federal Register, October 27, 1980.

Note.—In referring to references, paragraph numbers are usually specified. For example, a reference to paragraph 4.1 of reference B would be shown herein as ref. B:4.1.

2. Signals in Space

2.1 RF Characteristics

The radio frequency characteristics of all signals employed by ATARS conform to the U.S. National Aviation Standard for DABS (ref. A).

3. Signal Content

Note.—The DABS National Aviation Standard (ref. A) describes the message format structures and coding which must be used in all DABS transmissions. This section further defines the DABS formats and information coding used for the transmission of ATARS/BCAS messages.

3.1 Data Blocks

The interrogation and reply data blocks can cotain either 56 or 112 bits.

3.2 Format Structure

DABS transmission formats consists of 56 or 112 bits of which 24 bits are used as the address while the rest are used for information transfer. The interrogation and reply formats which can contain ATARS/ BCAS information are presented in Figures 3.2–1 and 3.2–2 respectively.

3.2.1 Bit Numbering and Sequence

In the description of the advisory subfields, bits are numbered consecutively with bit 1 being the first bit in the advisory subfield. In the description of other subfields of the description of mission fields (3.2.2.2), bits are numbered consecutively with bit 1 being the first bit transmitted in the DABS interrogation or reply. Numerical values encoded by groups of bits are encoded with the MSB transmitted first. Bits designated as "not assigned" are transmitted as all zero, and are reserved for assignment in future National Aviation Standards.

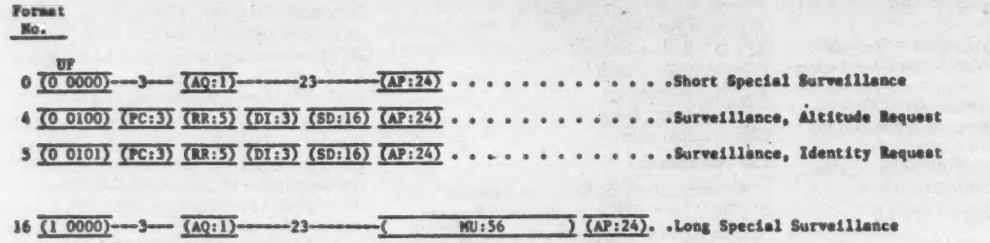
3.2.2 Fields

Information is coded in fields which consist of one or more bits. In this document the decemal equivalent of the binary code formed by the bit sequence within a field is used as the designator of the field function.

Note.—An an example, the 5-bit UF field is used to designate the uplink format type. A surveillance interrogation with identity has in its UF field position the bit sequence 00101. Since $00101_2 = 5_{10}$, this format is designated as UF=5.

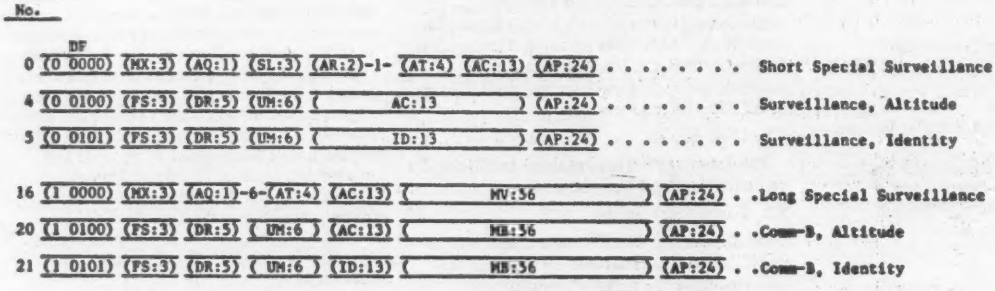
Codes designated as "not assigned" are reserved for assignment in future National Aviation Standards. Fields containing numeric data are encoded as positive integer quantities unless otherwise noted. The LSB value and the allowed range of values are included for all numeric quantities. Unless otherwise noted, when the value of a numeric quantity is outside the indicated range of values, it will be encoded as equal to the nearest end point of the range. Unless otherwise noted, the coded value of a numeric quantity is the quantized value nearest the actual value of the quantity (i.e., the value is rounded off rather than truncated).

BILLING CODE 4910-13-M


Format No.
UF
0 (0 0000)---3--- (AQ:1)-------23-------(AP:24) . . . . . .Short Special Surveillance
4 (0 0100) (PC:3) (RR:5) (DI:3) (SD:16) (AP:24) . . . . . .Surveillance, Altitude Request
5 (0 0101) (PC:3) (RR:5) (DI:3) (SD:16) (AP:24) . . . . . .Surveillance, Identity Request
16 (1 0000)---3--- (AQ:1)-------23--------(MU:56) (AP:24). .Long Special Surveillance
20 (1 0100) (PC:3) (RR:5) (DI:3) (SD:16) (MA:56) (AP:24). .Comm-A, Altitude Request
21 (1 0101) (PC:3) (RR:5) (DI:3) (SD:16) (MA:56) (AP:24). .Comm-A, Identity Request

Note: (1) (XX:M) denotes a field designated "XX" which is assigned M bits.
(2) ---M--- denotes unassigned coding space, M bits; must be set to all zeroes.
(3) The format number in the above uplink formats (UP) corresponds to the binary code in the first 5 bits of the interrogation.
(4) UP=0 and 16 are air-air interrogation formats used by BCAS. The other UP formats herein are used by ground ATARS equipment.

Fig. 3.2-1. DABS Interrogation or Uplink Formats Used for ATARS/BCAS Messages.


Format No.
DF
0 (0 0000) (MX:3) (AQ:1) (SL:3) (AR:2)-1- (AT:4) (AC:13) (AP:24) . . . . . Short Special Surveillance
4 (0 0100) (FS:3) (DR:5) (UM:6) (AC:13) (AP:24) . . . . . Surveillance, Altitude
5 (0 0101) (FS:3) (DR:5) (UM:6) (ID:13) (AP:24) . . . . . Surveillance, Identity
16 (1 0000) (MX:3) (AQ:1)-6-(AT:4) (AC:13) (MV:56) (AP:24) . .Long Special Surveillance
20 (1 0100) (FS:3) (DR:5) (UM:6) (AC:13) (MB:56) (AP:24) . .Comm-B, Altitude
21 (1 0101) (FS:3) (DR:5) (UM:6) (ID:13) (MB:56) (AP:24) . .Comm-B, Identity

Note: (1) (XX:M) denotes a field designated "XX" which is assigned M bits.
(2) ---M--- denotes unassigned coding space, M bits; must be set to all zeroes.
(3) The format number in the above downlink formats (DF) corresponds to the binary code in the first 5 bits of the reply.
(4) DF=0 and 16 are reply formats to BCAS interrogations. The other DF formats herein are replies to ground ATARS interrogations.

Fig. 3.2-2. DABS Reply or Downlink Formats Used for ATARS/BCAS Messages.

BILLING CODE 4910-13-C

3.2.2.1 Essential Fields.

Each DABS transmission contains two essential fields. The first essential field is a 5 bit format descriptor which occurs at the beginning of the transmission. This field is designated UF Uplink Format) for interrogations and DF (Downlink Format) for replies. The UF and DF codes pertinent to this Standard are given in Figs. 3.2–1 and 3.2–2 respectively. The second essential field is a 24 bit field which contains a DABS address and carries parity information according to ref. a: 4.1. This field is designated AP (Address/Parity) and is located at the end of the transmission.

3.2.2.2 Mission Fields.

Coding space outside the essential fields is used to transmit the mission fields. For specific missions, a specific set of fields is prescribed.

Note.—Mission fields have two-letter designators within this Standard.

3.2.2.3 Subfields.

Subfields may appear within mission fields. Subfields used in ATARS advisories may be used as constituent elements of more than one larger subfield. The name, length (number of bits) and coding of a defined subfield are the same wherever it appears; however, the location and protocol for use may vary.

Note.—Subfields of mission fields are labeled with three-character alphanumerica designators within this Standard. Subfields of three-character designator subfields are labeled with four-character alphanumeric designators within this Standard.

3.3 Field Descriptions

For all mission fields and subfields which are processed by the ATARS avionics, the relevant characteristics (location and coding) are described in this section. In some cases this description duplicates the description found in other National Aviation Standards; in other cases it introduces new information that is not found elsewhere. Mission fields and subfields defined by the DABS National Aviation Standard (ref. A) are described in 3.3.1. All othermission fields and subfields are described in 3.3.2. Table 3.3–1 provides an index of all described mission fields and the three-character designator subfield groups (if any) within them. Appendix A provides an alphabetically ordered index of all essential fields, mission fields, three-character designator subfields and four-character designator subfields described in this Standard.

Note.—Duplicate mission field and subfield descriptions aid in identifying those areas in which the various National Aviation Standards must be cordinated with respect to future modifications or additions.

3.3.1 Fields and Subfields Defined by DABS National Aviation Standard

Location and coding of mission fields and subfields required for transmission of ATARS information which are specified by the DABS National Aviation Standard (ref. A), are described in alphabetical order in the following paragraphs.

Note.—Certain coding reserved for ASA services in the DABS National Aviation Standard is further described in this section.

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TABLE 3.3-1

FIELD INDEX

Field	Sub Field	Bits No. of Bits	Bits Position	Formats Up	Formats Down	Reference Paragraph(s) Content	Reference Paragraph(s) Protocol
AR		2	13-14		X	3.3.2.1	4.5
DI		3	14-16	X		3.3.1.1	4.1.3;4.2.3
DR		5	9-13		X	3.3.1.2	4.3.2.2
MA		56	33-88	X		3.3.1.3; 3.3.2.2	
	Note: The three-character designator MA subfields identified below may be further divided into information subfields. A summary of the subfield structure (if any) of each three-character designator MA subfield is contained in the paragraph defining its content.						
	ATARS Resolution Message subfields of MA:						4.1.1; 4.1.2.1-3; 4.2.1.1
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	COL	14	41-54			3.3.2.2.3	
	TRA	19	55-73			3.3.2.2.23	
	***	12	74-85			See Note 1	
	SIT	3	86-88			3.3.2.2.14	
	Note: This description of the ATARS Resolution Message supercedes the the description in ref. B and will be incorporated into subsequent publications of that document.						
	Six Advisories Message subfields of MA:						4.1.1; 4.1.2.5-7
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	***	12	41-52			See Note 1	
	***	12	53-64			See Note 1	
	SIX	6	65-70			3.3.2.2.15	
	SIX	6	71-76			3.3.2.2.15	
	SIX	6	77-82			3.3.2.2.15	
	SIX	6	83-88			3.3.2.2.15	

TABLE 3.3-1 (cont'd)

FIELD INDEX

Field	Sub Field	Bits No. of Bits	Bits Position	Formats Up	Formats Down	Reference Paragraph(s) Content	Reference Paragraph(s) Protocol
MA (Cont'd)	Three Advisories Message subfields of MA:						4.1.1; 4.1.2.4-7
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	***	18	41-58			See Note 2	
	***	18	59-76			See Note 2	
	***	12	77-88			See Note 1	
	Auxiliary Advisories Message subfields of MA:						4.2.2.7-9
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	If RST=0, plus:						
	TER	8	41-48			3.3.2.2.19	
	OBT	13	49-61			3.3.2.2.6	
	RST	1	62			3.3.2.2.11	
	OBT	13	63-75			3.3.2.2.6	
	OBT	13	76-88			3.3.2.2.6	
	Or, if RST=1, plus:						
	TER	8	41-48			3.3.2.2.19	
	OBT	13	49-61			3.3.2.2.6	
	RST	1	62			3.3.2.2.11	
	RTD	26	63-88			3.3.2.2.12	
	Own Plus Altitude Echo Message subfields of MA:						4.2.2.1; 4.2.2.6
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	ODS	24	41-64			3.3.2.2.7	
	AEC	24	65-88			3.3.2.2.1	
	Own Plus Proximity Message subfields of MA:						4.2.2.1-2
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	ODS	24	41-64			3.3.2.2.7	
	PDT	24	65-88			3.3.2.2.8	

TABLE 3.3-1 (cont'd)

FIELD INDEX

Field	Sub Field	Bits No. of Bits	Bits Position	Formats Up	Formats Down	Reference Paragraph(s) Content	Reference Paragraph(s) Protocol
MA (Cont'd)	Start/End Encounter Message subfields of MA:						4.2.2.2-3
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	PDT	24	41-64			3.3.2.2.8	
	SED	24	65-88			3.3.2.2.13	
	Dual Proximity Message subfields of MA:						4.2.2.2
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	PDT	24	41-64			3.3.2.2.8	
	PDT	24	65-88			3.3.2.2.8	
	Proximity Plus Altitude Echo Message subfields of MA:						4.2.2.2; 4.2.2.6
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	PDT	24	41-64			3.3.2.2.8	
	AEC	24	65-88			3.3.2.2.1	
	Start Threat Message subfields of MA:						4.2.2.1; 4.2.2.4
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	ODS	24	41-64			3.3.2.2.7	
	STD	24	65-88			3.3.2.2.16	
	Threat Message subfields of MA:						4.2.2.2; 4.2.2.5
	ADS	8	33-40			3.3.1.3.1; 3.3.2.2	
	PDT	24	41-64			3.3.2.2.8	
	THD	24	65-88			3.3.2.2.20	

TABLE 3.3-1 (cont'd)

FIELD INDEX

Field	Sub Field	Bits No. of Bits	Bits Position	Formats Up	Formats Down	Reference Paragraph(s) Content	Reference Paragraph(s) Protocol
MB		56	33-88		X	3.3.1.4; 3.3.2.3	
	Note: The notation (-n-) is used to denote bits that are not assigned.						
	Extended Capability Report subfields of MB:						4.4
	(-n-)	2	42-43				
	ACS	16	45-60			3.3.1.4.2	
	(-n-)	5	61-65				
	ATA	3	66-68			3.3.2.3.4	
	ARC	2	69-70			3.3.2.3.4	
	ECS	16	71-86			3.3.1.4.2	
	RAR Reply Message to ATARS subfields of MB:						4.3.2.1
	BDS	8	33-40			3.3.2.3.1	
	HO1	3	41-43			3.3.2.3.1	
	VE1	5	44-48			3.3.2.3.1	
	HO2	3	49-51			3.3.2.3.1	
	VE2	5	52-56			3.3.2.3.1	
	HO3	3	57-59			3.3.2.3.1	
	VE3	5	60-64			3.3.2.3.1	
	HO4	3	65-67			3.3.2.3.1	
	VE4	5	68-72			3.3.2.3.1	
	HO5	3	73-75			3.3.2.3.1	
	VE5	5	76-80			3.3.2.3.1	
	HO6	3	81-83			3.3.2.3.1	
	VE6	5	84-88			3.3.2.3.1	
	RAR Busy Message to ATARS subfields of MB:						4.3.2.1
	BDS	8	33-40			3.3.2.3.2	
	(-n-)	48	41-88				
	ATARS Extended Data Message subfields of MB:						4.1.3; 4.2.3
	BDS	8	33-40			3.3.2.3.3	
	CLM	4	41-44			3.3.2.3.3	
	(-n-)	44	45-88				

TABLE 3.3-1 (cont'd)

FIELD INDEX

		Bits		Formats		Reference Paragraph(s)	
Field	Sub Field	No. of Bits	Position	Up	Down	Content	Protocol
MU		56	33-88	X		3.3.1.5; 3.3.2.4	
	RAR Request Message and BCAS Resolution Message subfields of MU:						4.3.1
	UDS	8	33-40			3.3.2.4.1	
	DR1	4	43-46			3.3.2.4.1	
	AR1	4	47-50			3.3.2.4.1	
	DR2	4	51-54			3.3.2.4.1	
	AR2	4	55-58			3.3.2.4.1	
MV		56	33-88		X	3.3.1.6; 3.3.2.5.	
	RAR Reply Message to BCAS subfields of MV:						4.3.1
	VDS	8	33-40			3.3.2.5.1	
	HO1	3	41-43			3.3.2.5.1	
	VE1	5	44-48			3.3.2.5.1	
	HO2	3	49-51			3.3.2.5.1	
	VE2	5	52-56			3.3.2.5.1	
	HO3	3	57-59			3.3.2.5.1	
	VE3	5	60-64			3.3.2.5.1	
	HO4	3	65-67			3.3.2.5.1	
	VE4	5	68-72			3.3.2.5.1	
	HO5	3	73-75			3.3.2.5.1	
	VE5	5	76-80			3.3.2.5.1	
	HO6	3	81-83			3.3.2.5.1	
	VE6	5	84-88			3.3.2.5.1	
	RAR Busy Message to BCAS subfields of MV:						4.3.1
	VDS	8	33-40			3.3.2.5.2	
	(-n-)	48	41-88				
RR		5	9-13	X		3.3.1.7	4.1.3;4.2.3;4.3.2.1

TABLE 3.3-1 (concluded)

FIELD INDEX

Field	Sub Field	Bits No. of Bits	Bits Position	Formats Up	Formats Down	Reference Paragraph(s) Content	Reference Paragraph(s) Protocol
SD		16	17-32	X		3.3.1.8	
	Extended Data Readout subfields of SD:						4.1.3; 4.2.3
	RRS	4	17-20			3.3.1.8.1	
	(-n-)	12	21-32				
SL		3	10-12		X	3.3.2.6	4.5
UM		6	14-19		X	3.3.1.9	
	UM for ATARS subfields of UM						4.1.2.4;4.2.2.6
	AER	1	14			3.3.2.7.1	
	(-n-)	1	15				

*Note 1: Subfields 12 bits in length which are denoted by *** contain one of the following subfields: TPA (3.3.2.2.21), TEA (3.3.2.2.18), OBA (3.3.2.2.5), or RAA (3.3.2.2.9), or a null advisory (3.3.2.2.5).*

*Note 2: Subfields 18 bits in length which are denoted by *** contain one of the following subfields: TPE (3.3.2.2.22), AEE (3.3.2.2.2), TAE (3.3.2.2.17), OAE (3.3.2.2.4), RAE (3.3.2.2.10), or a null advisory (3.3.2.2.4).*

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3.3.1.1 DI Designator, Identification.

Uplink, 3 bits, 14 through 16. Appears in uplink surveillance and Comm-A formats, UF=4,5,20,21. Contains identification of coding in the SD field. Coding:

0=SD not used
1=SD contains multisite information (ref. A: 4.13.1.1)
2=SD contains ATARS information (ref. B: 3.3.2.10.1)
3–6=Not assigned
7=SD contains extended reply request (ref. A: 4.11:1.1.1)

Airborne ATARS equipments examine the content of the SD field whenever DI=7 appears with RR=19 in uplink surveillance and Comm-A formats, UF=4,5,20, and 21.

3.3.1.2 DR Downlink Request.

Downlink, 5 bits, 9 through 13. Appears in surveillance and Comm-B replies, DF=4,5,20.21.

Coding

0=No downlink request
1=B bit set
2=RAR bit set
3=RAR bit set and B bit set
4–15=Not assigned
16–310=see Comm-D protocol, ref. A:4.12.2.1

When the RAR bit is set, i.e., RAR is non-empty, airborne ATARS equipment cause DR=2 or 3 to be set, as appropriate.

Note 1.—Requests associated with codes 1–15 take priority over requests associated with codes 16–31.

Note 2.—The B bit is explained in ref. A:4.11.2.

3.3.1.3 MA Message, Comm-A.

Uplink, 56 bits, 33 through 88. Appears in Comm-A interrogations, UF=20 and 21. The MA field is used to transmit ATARS resolution advisory, traffic advisory and auxiliary advisory information to airborne ATARS equipments. Contains 8-bit ADS (Comm-A Definition) subfield.

Note.—MA message content and codes not related to ATARS are not included in this Standard.

3.3.1.3.1 Subfield in MA: ADS, A-Definition Subfield.

Uplink, 8 bits, 33 through 40, subfield in MA. Defines the data contained in the remainder of MA. For convenience in coding, ADS is expressed in two groups of 4 bits each. ADS1, 33 through 36, and ADS2, 37 through 40. ADS1 defines a specific A-sink (Comm-A destination) and ADS2 defines the specific message type for that A-sink. Ground ATARS messages use ADS1=1 and 3.

3.3.1.4 MB Message, Comm-B.

Downlink, 56 bits, 33 through 88. Appears in Comm-B replies, DF=20 and 21. The MB field is used by airborne ATARS equipments to transmit RAR information, Extended Capability Report and ATARS Extended Data (3.3.2.3.3) to the ground. Contains 8-bit BDS (Comm-B Definition) subfield.

3.3.1.4.1 Subfield in MB: BDS, B-Definition Subfield.

Downlink, 8 bits, 33 through 40, subfield in MB. Defines the data contained in MB. For convenience in coding, BDS is expressed in two groups of 4 bits each, BDS1, 33 through 36, and BDS2, 37 through 40. BDS1 defines a specific B-source (Comm-B source) and BDS2 defines the specific message type from that source. Comm-B messages originating from airborne ATARS equipments use BDS1=3.

3.3.1.4.2 Subfields in MB for Extended Capability Report.

The following subfields defined by the DABS National Aviation Standard appear in MB for an Extended Capability Report and are ATARS-related.

ACS: A-Capability, 16 bits, 45 through 60. Contains the identity (ADS1 values) of all on board operative A-sinks (Comm-A destinations).

Coding

To report the presence of the A-sink with ADS1=x, bit 45 + x is set to '1'.

Note.—The ATARS avionics is the destination for Comm-A messages containing the ADS1=1 and 3 codes in MA. Hence, operative ATARS avionics sets bits 46 and 48 in ACS to '1'.

ECS: Extended Capability, 16 bits, 71 through 86. Contains the identity (BDS1 values) of all on board operative B-sources (Comm-B sources).

Coding

To report the presence of the B-source with BDS1=x, bit 71 + x is set to '1'.

Note.—The ATARS avionics is a source for Comm-B messages containing the BDS1=3 code in MB. Hence, operative ATARS avionics sets bit 74 in ECS to '1'.

Note.—The following table provides a complete summary of the currently defined structure of MB for an Extended Capability Report.

Structure of MB for an Extended Capability Report

Position	Number of bits	Subfield	Remarks
33–36	4	BDS1	= 1.
37–40	4	BDS2	= 0.
41	1	CBS	
42–43	2		Not assigned.
44	1	FDS	
45–60	16	ACS	
61–65	5		Not assigned.
66–68	3	ATA	
69–70	2	ARC	
71–86	16	ECS	
87–88	2	EDS	

The BDS1, BDS2, CBS, FDS AND EDS subfields are defined in ref. A: 4.6.3.1 and are not ATARS-related. The ATA and ARC subfields are defined by this Standard in 3.3.2.3.4.

3.3.1.5 MU Message, Special Interrogation.

Uplink, 56 bits, 33 through 88. Appears in long special surveillance interrogation, UF=16. BCAS uses the MU field of a long special surveillance interrogation, UF=16, to transmit both an RAR Request Message and a BCAS Resolution Message to ATARS-equipped aircraft.

3.3.1.6 MV Message, Special Reply.

Downlink, 56 bits, 33 through 88. Appears in long special surveillance reply, DF=16. ATARS-equipped aircraft use the MV field of a long special surveillance reply, DF=16, to transmit an RAR Reply Message to BCAS and an RAR Busy Message to BCAS.

3.3.1.7 RR Reply Request.

Uplink, 5 bits, 9 through 13. Appears in surveillance and Comm-A interrogations, UF=4,5,20,21. Contains length and content of requested reply. The RR codes to which ATARS airborne equipments respond are 17 and 19, both of which elicit Comm-B replies. For these RR codes the contents of UM may be specified by coding in the SD field of the interrogation. If no UM content is specified, a voluntary message may be provided (ref. A: 4.7)

Coding

RR code	Requested MB content
17	Extended Capability Report (3.3.1.4.2, 3.3.2.3.4).
19	RAR Reply Message to ATARS (3.3.2.3.1) or RAR Busy Message to ATARS (3.3.2.3.2) or ATARS Extended Data (3.3.2.3.3).

Note.—If bit 1 of the RR code is a one, the last four bits of the 5-bit RR code, if transformed into their decimal equivalent, designate the assigned address, BDS1 value, of the requested source.

3.3.1.8 SD Special Designator.

Uplink, 16 bits, 17 through 32. Appears in surveillance and Comm-A interrogations, UF=4,5,20,21. Coding depends on the content of the DI fields.

Airborne ATARS equipments examine the contents of SD when DI=7 and RR=19 in the associated surveillance or Comm-A interrogation for Extended Data Readout information.

3.3.1.8.1 Subfield in SD for Extended Data Readout

The following subfield appears in SD if DI=7:

RRS: Reply Request, 4 bits, 17 through 20.

Coding

Corresponds to the BDS2 code (3.3.1.4.1) of the particular message type requested from the B-source identified by the accompanying RR code (3.3.1.7).

Note.—*Structure of SD for Extended Data Readout*

Position	Number of bits	Subfield	Remarks
17–20	4	RRS	
21–32	12		Not assigned.

3.3.1.9 UM Utility Message

Downlink, 6 bits, 14 through 19. Appears in surveillance and Comm-B replies, DF=4, 5, 20, 21. Contains requested or volunteered data (see ref. A: 4.7).

The presence of a pilot request for an altitude echo advisory is communicated by the airborne ATARS equipments to ground ATARS equipments using the UM field for ATARS.

Note.—The following table provides a complete summary of the currently defined structure of UM for ATARS.

Structure of UM for ATARS

Position	Number of bits	Subfield	Remarks
14	1	AER	
15	1		Not assigned.
16–19	4	ATS	

The AER subfield is defined by this Standard in 3.3.2.7.1. ATS is a subfield defined in ref. A: 4.18.2.2.

3.3.2 ATARS Fields and Subfields.

The following paragraphs describe the location and coding of those mission fields and subfields which are required for the transmission of ATARS information and which are not defined in the DABS National Aviation Standard. Certain mission fields and subfields are also defined by the Active BCAS National Aviation Standard and have been coordinated with that Standard to provide for compatibility.

3.3.2.1 AR ASA Resolution Capability Report.

Downlink, 2 bits, 13 through 14. Appears in special surveillance reply format, DF=0. Contains ASA resolution capability of aircraft.

Coding

0=No ASA resolution capability
1=ATARS only
2=Active BCAS
3=Not assigned

Airborne ATARS equipments cause AR=1 to be set.

Note.—AR is also defined in ref. B: 3.3.2.1.

3.3.2.2 MA Message, Comm-A.

Ground ATARS equipment uses the MA field of Comm-A interrogations (3.3.1.3) to transmit all ATARS advisory (resolution, auxiliary and traffic) messages. Table 3.3–2 summarizes these ATARS advisory messages, their associated MA subfield structure, and the class of ATARS users which can utilize them. The ATARS advisory subfields appearing in Table 3.3–2 are described in alphabetical order in the following sections.

Note.—A summary of the structure of each ATARS advisory subfield is contained at the end of the paragraph which describes its contents.

3.3.2.2.1 AEC: Altitude Echo Advisory Subfield.

The Altitude Echo Advisory Subfield (AEC) provides the ATARS aircraft with own altitude as determined from the encoded altitude reports of own aircraft. When an aircraft is below the lowest usable flight level (see note), the echoed altitude is the reported altitude adjusted for barometric pressure from the DABS/ATARS site. The following subfields appear in AEC.

Note.—When the pressure altitude of an aircraft as corrected for reported ground altimeter setting is below 18,000 feet, air traffic control assigns altitudes according to corrected altitudes. Otherwise altitudes are assigned according to pressure altitudes (altitudes referenced to 29.92 inches of mercury) known as *flight levels*. The altitude echo will adhere to the same procedures in order to provide agreement between echoed altitude and cockpit altimeter readings.

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TABLE 3.3-2 - MA SUBFIELD STRUCTURE OF ATARS MESSAGES

ATARS Message Name	Class of ATARS Service	Subfield Structure of MA		
		Bit33<----->Bit40		Bit41<----->Bit88
		(ADS1:4)	(ADS2:4)	
ATARS Resolution	0,1,2	=3	=0	(COL:14)(TRA:19)(***:12)(SIT:3)
Not Assigned	-	=3	=1-15	-
Six Advisories	0	=1	=0	(***:12)(***:12)(SIX:6)(SIX:6)(SIX:6)(SIX:6)
Three Advisories	0	=1	=1	(***:18)(***:18)(***:12)
Not Assigned	-	=1	=2	-
ATCRBS Track Block	0,1,2	=1	=3	Note: Defined in ref. B: 3.3.2.3.2 and is sent only to BCAS equipped aircraft.
Not Assigned	-	=1	=4-6	-
Auxiliary Advisories	1,2	=1	=7	When RST=0 (TER:8)(OBT:13)(RST:1)(OBT:13)(OBT:13) When RST=1 (TER:8)(OBT:13)(RST:1)(RTD:26)
Own Plus Altitude Echo	2	=1	=8	(ODS:24)(AEC:24)
Own Plus Proximity	2	=1	=9	(ODS:24)(PDT:24)
Start/End Encounter	2	=1	=10	(PDT:24)(SED:24)
Dual Proximity	1,2	=1	=11	(PDT:24)(PDT:24)
Proximity Plus Altitude Echo	1,2	=1	=12	(PDT:24)(AEC:24)
Start Threat	2	=1	=13	(ODS:24)(STD:24)
Threat	1,2	=1	=14	(PDT:24)(THD:24)
Not Assigned	-	=1	=15	-

(***:12) can be either (TPA:12), (TEA:12), (OBA:12), OR (RAA:12), or a Null Advisory (3.3.2.2.5).

(***:18) can be either (TPE:18), (AEE:18), (TAE:18), (OAE:18), OR (RAE:18), or a Null Advisory (3.3.2.2.4).

Note: (XXX:N) denotes a subfield designated "XXX" which is assigned N bits.

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AEAL: Altitude Echo, 10 bits, 3 through 12. This is own aircraft's reported altitude as echoed by the ground ATARS equipment.

Coding

LSB=100 feet. The minimum and maximum values are −1000 feet and +101,300 feet respectively. When no altitude is available, AECC=1 and AEAL=1023. The value of the altitude echo in feet is 100*AEAL−1000.

AECA: Adjusted Altitude Bit, 1 bit, 1.

Coding

0=AEAL altitude has not been corrected for ground altimeter setting
1=AEAL altitude has been corrected for ground altimeter setting

AECC: Reported Altitude Confidence Level, 1 bit, 2.

Coding

0=Reported altitude is available
1=Reported altitude is unavailable (either not reported or of low confidence)

Note.—*Structure of AEC Subfield*

Position	Number of bits	Subfield	Remarks
1	1	AECA	
2	1	AECC	
3-12	10	AEAL	
13-24	12		Not assigned.

3.3.2.2.2 AEE: 18 Bit Altitude Echo Advisory Subfield.

The 18 Bit Altitude Echo Advisory Subfield (AEE) is a subfield which can provide an altitude echo advisory as defined in 3.3.2.2.1. The following subfields appear in AEE.

AEAL: Altitude Echo, 10 bits, 7 through 16. This subfield is as defined in 3.3.2.2.1.

AECA: Adjusted Altitude Bit, 1 bit, 5. This subfield is as defined in 3.3.2.2.1.

AECC: Confidence Level for Reported Altitude, 1 bit, 6. This subfield is as defined in 3.3.2.2.1.

SUBN: Subfield Indicator, 4 bits, 1 through 4. Defines the advisory subfield type contained in an 18 bit advisory subfield of an ATARS Three Advisories Message.

Coding

0=AEE, 18 Bit Altitude Echo Advisory (3.3.2.2.2)
1-12=TPE, 18 Bit Threat/Proximity Advisory (3.3.2.2.22). In this case SUBN provides clock bearing to the encounter aircraft. LSB=1 clock sector of 30 degrees. The minimum and maximum values are 1 o'clock and 12 o'clock respectively.
13=TAE, 18 Bit Terrain Advisory Subfield (3.3.2.2.17)
14=OAE, 18 Bit Obstruction Advisory Subfield (3.3.2.2.4)
15=RAE, 18 Bit Restricted Airspace Advisory Subfield (3.3.2.2.10)

If no advisory has been generated which requires use of an 18 bit advisory subfield, then an OAE Subfield, SUBN=14, with CLBR=0 (Null Advisory for an 18 bit advisory subfield) is inserted in that subfield.

Note.—*Structure of AES Subfield*

Position	Number of bits	Subfield	Remarks
1-4	4	SUBN	=0
5	1	AECA	
6	1	AECC	
7-16	10	AEAL	
17-18	2		Not assigned

3.3.2.2.3 COL: ATARS Resolution Advisory Column Subfield.

The ATARS Resolution Advisory Column Subfield (COL) contains an image of the RAR column associated with the ground ATARS site from which the advisory orginates and indicates the resolution advisories to be active and inactive for that column.

Coding

Each bit in the COL subfield is a dedicated bit representing a specific ATARS resolution advisory.

The bits in COL have the following meaning:

Bit	ATARS resolution advisory
1	Climb.
2	Don't descend.
3	Don't descend faster than 500 FPM.
4	Don't descend faster than 1000 FPM
5	Don't descend faster than 2000 FPM
6	Descend.
7	Don't climb.
8	Don't climb faster than 500 FPM.
9	Don't climb faster than 1000 FPM.
10	Don't climb faster than 2000 FPM.
11	Turn left.
12	Turn right.
13	Don't turn left.
14	Don't turn right.

A bit set to '1' indicates that ATARS intends the associated resolution advisory to be active (associated RAR bit set to '1'). A bit set to '0' indicates that ATARS intends the associated resolution advisory to be inactive (associated RAR bit set to '0').

3.3.2.2.4 OAE: 18 Bit Obstruction Advisory Subfield.

The 18 Bit Obstruction Advisory Subfield (OAE) contains information describing the proximity of own aircraft to an obstruction. The following subfields appear in OAE.

ARTO: Altitude Relative to Obstruction, 3 bits, 5 through 7. Represents the current altitude clearance between own aircraft and the obstruction.

Coding

The Altitude Relative to Obstruction is coded in two's complement notation with LSB=200 feet. The minimum and maximum values are −800 feet and 600 feet respectively.

CLBR: Clock Bearing, 4 bits, 8 through 11. Values from 1 to 12 indicate the bearing from own aircraft to the object (obstruction or aircraft) causing the advisory. Bearing is expressed as a clock position with 12 o'clock in the same direction as own ground track course.

Coding

LSB=1 clock sector of 30 degrees. The minimum and maximum values are 1 o'clock and 12 o'clock respectively. A value of 0 indicates that no advisory information is present in this advisory subfield. Values of 13, 14, and 15 are not assigned in this subfield.

FTAT: First Time Advisory Transmitted, 1 bit, 12.

Coding

0=An advisory for this object (obstruction or aircraft) was uplinked to own aircraft on the previous DABS cycle.
1=An advisory for this object (obstruction or aircraft) was not uplinked to own aircraft on the previous DABS cycle

Note.—If desired, the ATARS avionics can use FTAT to provide an audible alarm for annunication of an advisory when it is first uplinked.

SUBN: Subfield Indicator, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.2.

Note 1.—Structure of OAE Suffield.

Structure of OAE Subfield

Position	Number of bits	Subfield	Remarks
1-4	4	SUBN	=14
5-7	3	ARTO	
8-11	4	CLBR	
12	1	FTAT	
13-18	6		Not assigned.

Note 2.—The OAE Subfield with CLBR=0 serves as the 18 bit advisory subfield Null Advisory.

3.3.2.2.5 OBA: 12 Bit Obstruction Advisory Subfield.

Except for CZSI, as defined below, the 12 Bit Obstruction Advisory Subfield contains the same information as the first 12 bits in OAE (3.3.2.2.4). The following subfields appear in OBA.

ARTO: Altitude Relative to Obstruction, 3 bits, 5 through 7. This subfield is as defined in 3.3.2.2.4.

CLBR: Clock Bearing, 4 bits, 8 through 11. This subfield is as defined in 3.3.2.2.4.

CZSI: Class Zero Subfield Indicator, 4 bits, 1 through 4. Defines the advisory subfield type contained in a 12 bit advisory subfield of an ATARS Resolution Message and Three Advisories Message.

Coding

0=Not assigned
1-12=TPA, 12 Bit Threat/Proximity Advisory
13=TEA, 12 Bit Terrain Advisory
14=OBA, 12 Bit Obstruction Advisory
15=RAA, 12 Bit Restricted Airspace Advisory

Note.—When CZSI=1 through 12, CZSI is interpreted identically to CLBR as defined in 3.3.2.2.4.

If no advisory has been generated which requires use of a 12 bit advisory subfield, then an OBA Subfield with CZSI=14 and CLBR=0 (Null Advisory for a 12 bit advisory subfield) is inserted in that subfield.

FTAT: First Time Transmitted, 1 bit, 12. This subfield is as defined in 3.3.2.2.4.

Note.—*Structure of OBA Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CZSI	=14
5–7	3	ARTO	
8–11	4	CLBR	
12	1	FTAT	

3.3.2.2.6 OBT: 13 Bit Obstruction Advisory Subfield.

The 13 Bit Obstruction Advisory Subfield (OBT) provides an obstruction advisory for Class 1 and Class 2 users. It differs from the obstruction advisory used for Class 0 Service (OBA and OAE) in that it includes the range to the obstruction. The following subfields appear in OBT.

ARTO: Altitude Relative to Obstruction, 3 bits, 5 through 7. This subfield is as defined in 3.3.2.2.4.

CLBR: Clock Bearing, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.4.

FTAT: First Time Advisory Transmitted, 1 bit, 13. This subfield is as defined in 3.3.2.2.4.

RNGO: Range to obstruction, 5 bits, 8 through 12. Contains the range to the obstacle.

Coding

LSB=0.2 NM. The minimum and maximum values are 0 NM and 6.2 NM respectively.

Note.—*Structure of OBT Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CLBR	
5–7	3	ARTO	
8–12	5	RNGO	
13	1	FTAT	

3.3.2.2.7 ODS: Own Data Subjield.

The Own Data Subfield (ODS) contains parameters of the aircraft to which the message is addressed. The aircraft parameters are those used by the ground ATARS computer. The following subfields appear in ODS.

OACL: Own ATARS Class, 3 bits 19 through 21. Defines the class of service which the ground is providing to the aircraft.

Coding

0=ATARS Class 0
1=ATARS Class 1
2=ATARS Class 2
3–7=Not assigned

Note.—The class of ATARS service to be assigned to the aircraft is downlinked by the aircraft in the Extended Capability field (3.3.1.4.2). The value of OACL is based upon this downlinked information.

OGTC: Own Ground Track Course, 7 bits, 1 through 7. Contains the ground track course of own aircraft referenced to magnetic north at the DABS sensor.

Coding

Own Ground Track Course is transmitted in two's complement notation with an LSB=2.8125 degrees. The minimum and maximum values are −180 degrees and +177.1875 degrees respectively.

OSPD: Own Groundspeed, 7 Bits, 8 through 14. Contains the groundspeed of own aircraft used by the ATARS ground equipment.

Coding

For OSPD.LE.60, LSB=10 knots and own groundspeed is OSPD*10 knots. For OSPD.GE.61, LSB=30 knots and own groundspeed is 600 knots + (OSPD−60)* 30 knots. The minimum and maximum values of own groundspeed are 0 knots and 2610 knots respectively.

OTNR: Own Ground Track Turn Rate, 4 Bits, 15 through 18. Contains the ground track turn rate of own aircraft.

Coding

The turn rate is transmitted in two's complement notation with a LSB=1 degree per second. Positive values indicate turns to the right and negative values indicate turns to the left. The minimum and maximum values are −8 degrees per second and +7 degrees per second respectively.

SNIN: Sensor Intitation Bit, 1 bit, 22.

Coding

0=Sensor uplinking this data is not initiating primary ATARS service
1=Sensor uplinking this data is initiating primary ATARS service

Note.—This notifies any on board logic to expect track assignment discontinuities.

Note.—*Structure of ODS Subfield*

Position	Number of bits	Subfield	Remarks
1–7	7	OGTC	
8–14	7	OSPD	
15–18	4	OTNR	
19–21	3	OACL	
22	1	SNIN	
23–24	2		Not assigned.

3.3.2.2.8 PDT: Position Data Subfield.

The Position Data Subfield (PDT) contains basic position information on a proximate or threat aircraft. The following subfields appear in PDT.

AEQP: ATARS Equipped, 1 bit, 23.

Coding

0=Encounter aircraft is not equipped for or is not currently receiving ATARS service.
1=Encounter aircraft is equipped for and is currently receiving ATARS service.

ALRL: Fine Relative Altitude, 3 bits, 10 through 12. Provides more precise information on the relative altitude of the encounter aircraft. Interpretation depends on coding of Altitude Zone, ALZN (see ALZN below).

Coding

Previous altitude zone ALZN	Fine relative altitude ALRL	LSB	Magnitude of relative altitude
0 or 2	0 to 6	200 feet	(200*ALRL) +600 feet.
0 or 2	7		If not part of Threat Message, 7=2000 feet. Otherwise use Relative Altitude Extension (3.3.2.2.20).
1 or 3	0 to 5	100 feet	100*ALRL feet.
1	6 or 7		Not assigned.
3	6		Altitude unknown.
3	7		Not assigned.

ALZN: Relative Altitude Zone, 2 bits, 8 and 9. Indicates the relative altitude zone of the encounter aircraft. The relative altitude is defined as the traffic altitude less own altitude.

Coding

0=Relative altitude .LT.−500 feet
1=Relative altitude .GE.−500 feet and relative altitude .LT. 0
2=Relative altitude .GT.−500 feet
3=(Relative altitude .GE. 0 and relative altitude .LE. 500 feet) *or* (altitude unknown)

ATCC: ATC Control, 1 bit, 22.

Coding

1=ATARS has not been notified that this aircraft is in communication with an air traffic controller
0=ATARS has been notified that this aircraft is in communication with an air traffic controller

CLBR: Clock Bearing, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.4.

CRSE: Compass Course, 3 bits, 19 through 21. Contains the compass course of the encounter aircraft as referenced to magnetic north at the DABS sensor.

Coding

0=North
1=Northeast
2=East
3=Southeast
4=South
5=Southwest
6=West
7=Northwest

FNBR: Fine Bearing, 3 bits, 5 through 7. Contains more resolution on the bearing of the encounter aircraft. The more precise bearing is obtained by adding the fine bearing to the corresponding clock bearing (CLBR).

Coding

The fine bearing is transmitted in two's complement notation with an LSB=3.75 degrees. The minimum and maximum values are −15 degrees and 11.25 degrees respectively.

FTAT: First Time Advisory Transmitted, 1 bit, 24. This subfield is as defined in 3.3.2.2.4.

RNG1: Range, 6 bits, 13 through 18. Contains the range to the encounter aircraft.

Coding

LSB=0.3 NM. The minimum and maximum values are 0 NM and 18.9 NM respectively.

Note.—*Structure of PDT Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CLBR	
5–7	3	FNBR	
8–9	2	ALZN	
10–12	3	ALRL	
13–18	6	RNG1	
19–21	3	CRSE	
22	1	ATCC	
23	1	AEQP	
24	1	FTAT	

3.3.2.2.9 RAA: 12 Bit Restricted Airspace Advisory Subfield.

The 12 Bit Restricted Airspace Advisory Subfield (RAA) contains information indicating that own aircraft has entered restricted airspace or a terminal control area. The RAA is not uplinked for entry into a terminal control area if ATARS has been notified that the aircraft is controlled. The following subfields appear in RAA.

ASPT: Airspace Type, 4 bits, 5 through 8. Indicates the type of airspace penetration which has prompted the alert.

Coding

0=Unspecified Airspace Type
1=Restricted Area
2=Terminal Control Area
3=Prohibited Area
4–15=Not assigned

CZSI: Class Zero Subfield Indicator, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.5.

FTAT: First Time Advisory Transmitted, 1 bit, 9. This subfield is defined in 3.3.2.2.4.

Note.—*Structure of RAA Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CZSI	=15.
5–8	4	ASPT	
9	1	FTAT	
10–12	3		Not assigned.

3.3.2.2.10 RAE: 18 Bit restricted Airspace Advisory Subfield.

Except for SUBN as defined below, the first 12 bits of an 18 Bit Restricted Airspace Advisory Subfield (RAE) are the same as the 12 Bits in RAA (3.3.2.2.9). The following subfields appear in RAE.

ASPT: Airspace Type, 4 bits, 5 through 8. This subfield is as defined in 3.3.2.2.9.

FTAT: First time Advisory Transmitted, 1 bit, 9. This subfield is as defined in 3.3.2.2.4.

SUBN: Subfield Indication, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.2.

Note.—*Structure of RAE Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	SUBN	=15.
5–8	4	ASPT	
9	1	FTAT	
10–18	9		Not assigned.

3.3.2.2.11 RST: 1 Bit Restricted Airspace Status Subfield.

The 1 Bit Restricted Airspace Status Subfield (RST) indicates the information content in the last 26 bits of the MA field of an ATARS Auxiliary Advisories Message.

Coding

0=Last 26 bits of MA field contain two 13 bit Obstruction Advisory Subfields (OBT)
1=Last 26 bits of MA field contains a 26 bit restricted Airspace Advisory Subfield (RTD)

3.3.2.2.12 RTD: 26 Bit Restricted Airspace Advisory Subfield.

The 26 bit Restricted Airspace Advisory Subfield (RTD) provides a restricted airspace advisory for Class 1 and Class 2 users. The following subfields appear in RTD.

ASID: Restricted Airspace Identifier, 19 bits, 5 through 23. This subfield is meaningful only when the airspace type is a restricted area (ASPT=1).

Coding

Bits 5 through 18 contain a binary coded integer. Bits 19 through 23 contain a letter suffix identified by alphabetic position, i.e., 1=A, 2=B, . . . 26=Z.

ASPT: Airspace Type, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.9.

FTAT: First Time Advisory Transmitted, 1 bit, 24. This subfield is as defined in 3.3.2.2.4.

Note.—*Structure of RTD Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	ASPT	
5–23	19	ASID	
24	1	FTAT	
25–26	2		Not assigned.

3.3.2.2.13 SED: Start/End Data Subfield.

The Start/End Data Subfield (SED) contains information useful for initiating a proximate on-board track or ending a proximate or threat track on an encounter aircraft. The following subfields appear in SED.

ACAB: Aircraft Abbreviated Data, 9 bits, 16 through 24. This data subfield is reserved for descriptive information on the encounter aircraft.

ACLM: Aircraft Climb Performance Capability, 4 bits, 12 through 15.

Note.—This subfield indicates the climb capabilities of an aircraft in order to assist the ground ATARS equipment in selecting vertical resolution advisories.

The value of ACLM is fixed for a particular aircraft type. Assignments are not specified in this Standard.

GSPD: Groundspeed, 7 bits 2 through 8. Contains the groundspeed of the encounter aircraft.

Coding

For GSPD.LE.60, LSB=10 knots and groundspeed is GSPD* 10 knots. For GSPD.GE.61, LSB=30 knots and groundspeed is 600 knots+(GSPD–60)* 30 knots. The minimum and maximum values of groundspeed are 0 knots and 2610 knots respectively.

SEIN: Start/End Indicator, 1 bit, 1.

Coding

0=First uplink of information about the encounter
1=Encounter has ended

TRKN: Track Number, 3 bits, 9 through 11. This subfield contains the ATARS assigned track number for this aircraft. Range of values is from 0 to 7.

Note.—*Structure of SED Subfield*

Position	Number of bits	Subfield	Remarks
1	1	SEIN	
2–8	7	GSPD	
9–11	3	TRKN	
12–15	4	ACLM	
16–24	9	ACAB	

3.3.2.2.14 SIT: ATARS Site ID Subfield.

The ATARS Site ID Subfield (SIT) is uplinked as a subfield in an ATARS Resolution Message. It contains the ID of the ground ATARS site from which the ATARS Resolution Message originated.

Coding

0=Not assigned
1=ATARS Site A
2=ATARS Site B
3=ATARS Site C
4=ATARS Site D
5–7=Not assigned

3.3.2.2.15 SIX: 6 Bit Advisory Subfield.

The 6 Bit Advisory Subfield (SIX) contains one ATARS traffic advisory describing an encounter aircraft. This advisory can be either a proximity or a threat advisory. The following subfields appear in SIX.

ALZZ: Relative Altitude Zone for Class Zero, 2 bits, 5 and 6.

Coding

0=altitude unknown
1=relative altitude .LT. −500 feet
2=relative altitude .GE. −500 feet *and* relative altitude .LE. +500 feet
3=relative altitude .GT. +500 feet

CLBR: Block Bearing, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.4.

Note.—*Structure of SIX Subfield*

Position	Number of [illegible]	Subfield	Remarks
1–4	4	CLBR	
5–6	2	ALZZ	

3.3.2.2.16 STD: Start Threat Data Subfield.

The Start Threat Data Subfield (STD) contains information useful to the ATARS avionics in initiating a track on a threat aircraft. The following subfields appear in STD.

ACAB: Aircraft Abbreviated Data, 9 bits, 16 through 24. This subfield is as defined in 3.3.2.2.13.

ACLM: Aircraft Climb Performance Capability, 4 bits, 12 through 15. This subfield is as defined in 3.3.2.2.13.

CONT: Continuation, 1 bit, 1.

Coding

0=This is the first uplink of information about the encounter aircraft

1=This threat encounter is a continuation of a proximate encounter that has transitioned to a threat encounter

GSPD: Groundspeed, 7 bits, 2 through 8. This subfield is as defined in 3.3.2.2.13.

TRKN: Track Number, 3 bits, 9 through 11. This subfield is defined in 3.3.2.2.13.

Note.—*Structure of STD Subfield*

Position	Number of bits	Subfield	Remarks
1	1	CONT	
2–8	7	GSPD	
9–11	3	TRKN	
12–15	4	ALCM	
16–24	9	ACAB	

3.3.2.2.17 TAE: 18 Bit Terrain Advisory Subfield.

The 18 Bit Terrain Advisory Subfield (TAE) contains information describing the proximity of own aircraft to terrain. The following subfields appear in TAE.

ARHT: Altitude Relative to Highest Terrain, bits, 5 through 10. Represents own aircraft altitude minus the altitude of the highest terrain found in the ATARS terrain map for the projected path of own aircraft. Hence, positive values indicate the estimated clearance of own aircraft's projected path from the highest terrain feature along the path.

Coding

The altitude relative to highest terrain is transmitted in two's complement notation with an LSB=100 feet. The minimum and maximum values are −3200 feet and +3100 feet respectively.

FTAT: First Time Advisory Transmitted, 1 bit, 11. This subfield is defined in 3.3.2.2.4.

SUBN: Subfield Indicator, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.2.

Note.—*Structure of TAE Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	SUBN	=13
5–10	[illegible]	ARHT	
11	1	FTAT	

3.3.2.2.18 TEA: 12 Bit Terrain Advisory Subfield.

Except for CZSI as defined below the 12 Bit Terrain Advisory Subfield (TEA) is the same as the first 12 bits in TAE (3.3.2.2.17). The following subfields appear in TEA.

ARHT: Altitude Relative to Highest Terrain, 6 bits, 5 through 10. This subfield is as defined in 3.3.2.2.17.

CZSI: Class Zero Subfield Indicator, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.5.

FTAT: First Time Advisory Transmitted, 1 bit, 11. This subfield is defined in 3.3.2.2.4.

Note.—*Structure of TEA Subfield*

Position	Number of [illegible]	[illegible]	Remarks
1–4	[illegible]	CZSI	=13.
5–10	6	ARHT	
11	1	FTAT	
12	[illegible]		Not assigned.

3.3.2.2.19 TER: 8 Bit Terrain Advisory Subfield

The 8 bit Terrain Advisoiry Subfield (TER) provides a terrain advisory for Class 1 and Class 2 users. The following subfields appear in TER.

TERS: Terrain Advisory Status, 2 bits, 1 and 2. Indicates the status of the terrain advisory information in this subfield.

Coding

0=No terrain advisory exists

1=Terrain advisory exists and is being transmitted for first time

2=Terrain advisory exists and is being refreshed

3=Not assigned

ARHT: Altitude Relative to Highest Terrain, 6 bits, 3 through 8. This subfield is as defined in 3.3.2.2.17. The data contained in ARHT is meaningful only when a terrain advisory exists (i.e., TERS=1 or 2).

Note.—*Structure of TER Subfield*

Position	Number of bits	Subfield	Remarks
1–2	2	TERS	
3–8	6	ARHT	

3.3.2.2.20 THD: Threat Data Subfield

The Threat Data Subfield (THD) contains information which, together with the Position Data Subfield (PDT), is used to describe a threat aircraft. The following subfields appear in THD.

AEXT: Relative Altitude Extension, 3 bits, 11 through 13. Indicates the magnitude of the relative altitude of the threat aircraft when the magnitude of the threat aircraft's relative altitude is greater than or equal to 2000 feet. Relative Altitude Extension is used only when the magnitude of the relative altitude of the associated Position Data Subfield equals 2000 feet (ALZN=0 or 2 and ALRL=7).

Coding

LSB=500 feet. The magnitude of the relative altitude is 2000 feet + (500 * AEXT) feet. The minimum and maximum values of AEXT are 2000 feet and 5500 feet respectively.

FNHD: Fine Heading, 4 bits, 14 through 17. Provides more resolution on the course of encounter aircraft than is contained in the Position Data Subfield. The more precise course of the aircraft is obtained by adding the fine heading to the corresponding compass course (CRSE) in the Position Data Subfield.

Coding

The fine heading is transmitted in two's complement notation (with clockwise being positive) with an LSB=2.8125 degrees. The minimum and maximum values are −22.5 degrees and 19.6875 degrees respectively.

PHMD: Predicted Horizontal Miss Distance, 4 bits, 1 through 4. Contains the predicted horizontal miss distance between own aircraft and the threat aircraft, as determined by a non-turning projection of the instantaneous relative aircraft motion. If the sign of PHMD is positive, then the line between the aircraft positions is projected to rotate clockwise as seen from above the aircraft. If the sign is negative then the line is projected to rotate counter-clockwise. Its magnitude is the projected horizontal miss distance at closest approach.

Coding

The predicted horizontal miss distance is transmitted in two's complement notation with an LSB=0.2 NM. The minimum and maximum values are −1.6 NM and 1.4 NM respectively.

RESL: Resolution Advisory Bit, 1 bit, 23.

Coding

0=Threat aircraft described in this message is not causing own aircraft to receive an ATARS Resolution Message

1=Threat aircraft described in this message is causing own aircraft to receive an ATARS Resolution Message

TNTY: Turn Type of Encounter Aircraft, 2 bits, 18 and 19. Indicates the turn status of the encounter aircraft.

Coding

0=Not assigned

1=Straight

2=Turning left

3=Turning right

TRKN: Track Number, 3 bits, 20 through 22. This subfield is as defined in 3.3.2.2.13.

VSPD: Vertical Speed of Encounter Aircraft, 6 bits, 5 through 10. Contains the vertical speed of the encounter aircraft.

Coding

The vertical speed of encounter aircraft is transmitted in two's complement notation with an LSB=200 FPM. The minimum and maximum values are −6400 FPM and +6200 FPM respectively.

Note.—*Structure of THD Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	PHMD	
5–10	6	VSPD	
11–13	3	AEXT	
14–17	4	FNHD	
18–19	2	TNTY	
20–22	3	TRKN	
23	1	RESL	
24	1		Not assigned.

3.3.2.2.21 TPA: 12 Bit Threat/proximity Advisory Subfield.

The 12 Bit Threat/Proximity Advisory Subfield (TPA) contains 12 bits of information describing an encounter aircraft. The following subfields appear in TPA.

ALUN: Altitude Unknown Indicator, 1 bit, 7. This bit indicates when the altitude of the traffic is unknown to ATARS.

Coding

0=Altitude unknown
1=Altitude known

ALZN: Relative Altitude Zone, 2 bits, 5 and 6. This subfield is as defined in 3.3.2.2.8.

CRSE: Compass Course, 3 bits, 8 through 10. This subfield is as defined in 3.3.2.2.8.

CZSI: Class Zero Subfield Indication, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.5.

Note.—A 12 Bit Threat/Proximity Advisory Subfield is identified by CZSI=1 through 12. In this case, CZSI also indicates clock bearing and the coding for CZSI is the same as that for CLBR in 3.3.2.2.4.

FTAT: First Time Advisory Transmitted, 1 bit, 11. This subfield is as defined in 3.3.2.2.4.

TPIN: Threat/Proximity Indicator, 1 bit, 12.

Coding

0=This advisory is a proximity advisory
1=This advisory is a threat advisory

Note.—*Structure of TPA Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CZSI	
5–6	2	ALZN	
7	1	ALUN	
8–10	3	CRSE	
11	1	FTAT	
12	1	TPIN	

3.3.2.2.22 TPE Bit Threat/Proximity Advisory Subfield.

The 18 Bit Threat/Proximity Subfield (TPE) contains information describing the encounter aircraft that has been designated as either a threat or proximate aircraft relative to own aircraft. The following subfields appear in TPE.

ALRZ: Fine Relative Altitude for Class 0, 3 bits, 7 through 9. Provides more precise information on the relative altitude of the encounter aircraft. Interpretation depends upon coding of Altitude Zone, ALZN (3.3.2.2.8).

Coding

Relative altitude zone ALZN	Fine relative altitude for class 0, ALRZ	LSB	Magnitude of [illegible]
0 or 1	0 to 7	400 feet	(400*ALRZ) + 800 feet.
1 or 3	0 to 5	100 feet	100*ALRZ feet.
1	6 or 7		Not assigned.
3	6		
3	7		Not assigned.

ALZN: Altitude Zone, 2 bits, 5 and 6. This subfield is as defined in 3.3.2.2.8.

CRSE: Compass Course, 3 bits, 14 through 16. This subfield is as defined in 3.3.2.2.8.

FTAT: First Time Advisory Transmitted, 1 bit, 17. This subfield is as defined in 3.3.2.2.4.

RNGE: Range, 4 bits 10 through 13. Contains the range to the encounter aircraft.

Coding

LSB=0.3 NM. The minimum and maximum values are 0 NM and 4.5 NM respectively.

SUBN: Subfield Indicator, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.2.

Note.—An 18 Bit Threat/Proximity Advisory Subfield is identified by SUBN=1 through 12. In this case, SUBN also indicates clock bearing.

TPIN: Threat/Proximity Indicator, 1 bit, 18. This subfield is as defined in 3.3.2.2.21.

Note.—*Structure of TPE Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	SUBN	
5–6	2	ALZN	
7–9	3	ALRZ	
10–13	4	RNGE	
14–16	3	CRSE	
17	1	FTAT	
18	1	TPIN	

3.3.2.2.23 TRA: Threat/Proximity with Resolution Advisory Subfield.

The Threat/Proximity with Resolution Advisory Subfield (TRA) contains information describing the most critical encounter. The TRA Subfield is contained only within an ATARS Resolution Message. If there is an active resolution advisory contained in the ATARS Resolution Message, i.e. if COL ±0, then any advisory information contained in TRA refers to the most critical encounter which is causing a bit or bits to be set in COL. If there is no active resolution advisory contained in the ATARS Resolution Message, i.e. COL=0, the TRA refers to the most critical encounter.

The following subfields appear in TRA.

AEQP: ATARS Equipped, 1 bit, 16. This subfield is as defined in 3.3.2.2.8.

ALRZ: Fine Relative Altitude for Class 0, 3 bits, 7 through 9. This subfield is as defined in 3.3.2.2.22.

ALZN: Altitude Zone, 2 bits, 5 and 6. This subfield is as defined in 3.3.2.2.8.

ATCC: ATC Control, 1 bit, 17. This subfield is as defined in 3.3.2.2.8.

CLBR: Clock Bearing, 4 bits, 1 through 4. This subfield is as defined in 3.3.2.2.4.

CRSE: Compass Course, 3 bits, 14 through 16. This subfield is as defined in 3.3.2.2.8.

RNGE: Range, 4 bits, 10 through 13. This subfield is as defined in 3.3.2.2.22.

TPIN: Threat/Proximity Indicator, 1 bit, 19. This subfield is as defined in 3.3.2.2.21.

Note.—*Structure of TRA Subfield*

Position	Number of bits	Subfield	Remarks
1–4	4	CLBR	
5–6	2	ALZN	
7–9	3	ALRZ	
10–13	4	RNGE	
14–16	3	CRSE	
17	1	ATCC	
18	1	AEQP	
19	1	TPIN	

3.3.2.3. MB Message, Comm–B.

Airborne ATARS equipments use the MB field of Comm–B replies (3.3.1.4) to transmit to ground ATARS equipment the RAR Reply Message to ATARS, the RAR Busy Message to ATARS, ATARS Extended Data, and Extended Capability Report information.

3.3.2.3.1 Subfields in MB for an RAR Reply Message to ATARS.

The technique for encoding the RAR Reply Message to ATARS is described in 4.3.2.1.

BDS: B-Definition Subfield, 8 bits, 33 through 40 (3.3.1.4.1). An RAR reply message is identified by BDS1=3 and BDS2=0, the combination of which is equivalent to [illegible].

H01: RAR Column 1 Horizontal Advisories, 3 bits, 41 through 43. Contains the horizontal resolution advisories entry in column 1 (ATARS site A column) of the RAR.

Coding

0=No horizontal resolution advisories
1=Not assigned
2=Turn left
3=Turn right
4=Don't turn left
5=Don't turn right
6=Not assigned
7=Don't turn left and don't turn right

H02: RAR Column 2 Horizontal Advisories, 3 bits, 49 through 51. Contains the horizontal resolution advisories entry in column 2 (ATARS site B column) of the RAR.

Coding

As specified for H01.

H03: RAR Column 3 Horizontal Advisories, 3 bits, 57 through 59. Contains the horizontal resolution advisories entry in column 3 (ATARS site C column) of the RAR.

Coding

As specified for H01.

H04: RAR Column 4 Horizontal Advisories, 3 bits, 65 through 67. Contains the horizontal resolution advisories entry in column 4 (ATARS site D column) of the RAR.

Coding

As specified for H01.

H05: RAR Column 5 Horizontal Advisories, 3 bits, 73 through 75. Contains the horizontal resolution advisories entry in column 5 (Own BCAS column). This subfield is always zero for an ATARS-only aircraft.

H06: RAR Column 6 Horizontal Advisories, 3 bits, 81 through 83. Contains the horizontal resolution advisories entry in column 6 (All Other BCAS column) of the RAR.

Coding

As specified for H01.

VE1: RAR Column 1 Vertical Advisories, 5 bits, 44 through 48. Contains the vertical resolution advisories entry in column 1 (ATARS site A column) of the RAR.

Coding

0=No vertical resolution advisories
1–3=Not assigned
4=Don't descend
5=Don't descend faster than 500 FPM
6=Don't descend faster than 1000 FPM
7=Don't descend faster than 2000 FPM
8=Don't climb
9=Don't climb faster than 500 FPM
10=Don't climb faster than 1000 FPM
11=Don't climb faster than 2000 FPM
12=Not assigned
13=Climb
14=Not assigned
15=Descend
16=Don't descend and don't climb
17=Don't descend and don't climb faster than 500 FPM
18=Don't descend and don't climb faster than 1000 FPM
19=Don't descend and don't climb faster than 2000 FPM
20=Don't descend faster than 500 FPM and don't climb
21=Don't descend faster than 500 FPM and don't climb faster than 500 FPM
22=Don't descend faster than 500 FPM and don't climb faster than 1000 FPM
23=Don't descend faster than 500 FPM and don't climb faster than 2000 FPM
24=Don't descend faster than 1000 FPM and don't climb
25=Don't descend faster than 1000 FPM and don't climb faster than 500 FPM
26=Don't descend faster than 1000 FPM and don't climb faster than 1000 FPM
27=Don't descend faster than 1000 FPM and don't climb faster than 2000 FPM
28=Don't descend faster than 2000 FPM and don't climb
29=Don't descend faster than 2000 FPM and don't climb faster than 500 FPM
30=Don't descend faster than 2000 FPM and don't climb faster than 1000 FPM
31=Don't descend faster than 2000 FPM and don't climb faster than 2000 FPM

VE2: RAR Column 2 Vertical Advisories, 5 bits, 52 through 56. Contains the vertical resolution advisories entry in column 2 (ATARS site B column) of the RAR.

Coding

As specified for VE1.

VE3: RAR Column 3 Vertical Advisories, 5 bits, 60 through 64. Contains the vertical resolution advisories entry in column 3 (ATARS site C column) of the RAR.

Coding

As specified for VE1.

VE4: RAR Column 4 Vertical Advisories, 5 bits, 68 through 72. Contains the vertical resolution advisories entry in column 4 (ATARS site D column) of the RAR.

Coding

As specified for VE1.

VE5: RAR Column 5 Vertical Advisories, 5 bits, 76 through 80. Contains the vertical resolution advisories entry in column 5 (Own BCAS column). This subfield is always zero for an ATARS-only aircraft.

VE6: RAR Column 6 Vertical Advisories, 5 bits, 84 through 88. Contains the vertical resolution advisories entry in column 6 (All Other BCAS column) of the RAR.

Coding

As specified for VE1.

Note 1.—Structure of MB for an RAR reply message to ATARS.

Structure of MB for an RAR Reply Message to ATARS

Position	Number of bits	Subfield	Remarks
33–36	4	BDS1	=3
37–40	4	BDS@	=0
41–43	3	H01	
44–48	5	VE1	
49–51	3	H02	
52–56	5	VE2	
57–59	3	H03	
60–64	5	VE3	
65–67	3	H04	
68–72	5	VE4	
73–75	3	H05	
76–80	5	VE5	
81–83	3	H06	
84–88	5	VE6	

Note 2.—An RAR reply message with all H0x and VEx subfields containing zeroes indicates an empty RAR.

3.3.2.3.2 Subfields in MB for an RAR Busy Message to ATARS

BDS: B-Definition Subfield, 8 bits, 33 through 40 (3.3.1.4.1). An RAR Busy Message to ATARS is identified by BDS1=3 and BDS2=1, the combination of which is equivalent to BDS=49.

Note.—*Structure of MB for RAR Busy Message to ATARS*

Position	Number of bits	Subfield	Remarks
33–36	4	BDS1	=3
37–40	4	BDS2	=1
41–88	48		Not assigned.

3.3.2.3.3. Subfields in MB for an ATARS Extended Data Message.

ATARS Extended Data is downlinked in the MB field in order to provide specified information which is used by the ground ATARS equipment in providing ATARS service. This field is downlinked upon ground-initiated request as specified in ref. A: 4.11.1.1.

BDS: B-Definition Subfield, 8 bits, 33 through 40 (3.3.1.4.1). An ATARS Extended Data Message is identified by BDS1=3 and BDS2=2, the combination of which is equivalent to BDS=50.

CLM: Aircraft Climb Performance Capability, 4 bits, 41 through 44.

Note.—This subfield indicates the climb capabilities of own aircraft in order to assist the ground in selecting vertical resolution advisories.

The value of CLM is fixed for a particular aircraft type. Assignments are not specified in this Standard.

Note.—*Structure of MB for ATARS Extended Data Message*

Position	Number of bits	Subfield	Remarks
33–36	4	BDS1	=3.
37–40	4	BDS2	=2.
41–44	4	CLM	
45–88	44		Not assigned.

3.3.2.2.4. Subfields in MB for an Extended Capability Report

The following subfields appear in MB for an Extended Capability Report.

Note.—A summary of the complete MB subfield structure for an Extended Capability Report is given in 3.3.1.4.2.

ARC: ASA Resolution Capability, 2 bits, 69 through 70. Contains ASA resolution capability of aircraft.

Coding

0=No ASA resolution capability
1=ATARS only
2=Active BCAS
3=Not assigned

ATA: ATARS Service Class, 3 bits, 66 through 68. Contains class of ATARS service which aircraft is requesting.

Coding

0=ATARS Class 0
1=ATARS Class 1
2=ATARS Class 2
3–7=Not assigned

Note.—The class of service assigned to each ATARS airborne installation will be the lowest class that allows full functioning of all capabilities of the installed avionics.

3.3.2.4 MU Message, Special Interrogation.

BCAS uses the MU field (3.3.1.5) of a long special surveillance interrogation to transmit both an RAR Request Message and a BCAS Resolution Message to ATARS/BCAS and ATARS-only aircraft for air-air coordination.

3.3.2.4.1 Subfields in MU for an RAR Request Message and BCAS Resolution Message

An RAR Request Message and a BCAS Resolution Message share a common MU message format and are distinguished by the setting of the LCK subfield (see ref. B: 3.3.2.7.1). The following subfields appear in MU for an RAR Request Message and a BCAS Resolution Message and are ATARS-related.

AR1: Add Vertical Resolution Advisory, 4 bits, 47 through 50. This field is used by BCAS airborne equipment to post vertical maneuver restrictions in the RAR of ATARS-equipped aircraft. These restrictions are entered in the "All Other BCAS" column of the RAR. These restrictions are used subsequently by the ground ATARS equipment in selecting ATARS resolution advisories.

Coding

0=No complement to be added
1=Not assigned
2=Don't descend
3–6=Not assigned
7=Don't climb
8–15=Not assigned

AR2: Add Horizontal Resolution Message, 4 bits, 55 through 58. This field is used by BCAS airborne equipment to post horizontal maneuver restrictions in the RAR of ATARS-equipped aircraft. These restrictions are entered in the "All Other BCAS" column of the RAR. These restrictions are used subsequently by the ground ATARS equipment in selecting ATARS resolution advisories.

Coding

0=No complement to be added
1–12=Not assigned
13=Don't turn left
14=Don't turn right
15=Not assigned

Note.—In RAR Request Messages and BCAS Resolution Messages transmitted by Active BCAS, horizontal resolution is not used and AR2 is set to all zeroes. This field is defined to provide for future versions of BCAS which may use horizontal resolution (e.g., Full BCAS).

DR1: Delete Vertical Resolution Advisory, 4 bits, 43 through 46. This field is used by BCAS airborne equipment to post horizontal maneuver restrictions in the RAR of ATARS-equipped aircraft. These restrictions are deleted from the "All Other BCAS" column of the RAR.

Coding

0=No complement to be deleted
1=Not assigned
2=Don't descend
3–6=Not assigned
7=Don't climb
8–15=Not assigned

DR2: Delete Horizontal Resolution Advisory, 4 bits, 51 through 54. This field is used by a BCAS airborne equipment to delete horizontal maneuver restrictions in the RAR of ATARS-equipped aircraft. These restrictions are deleted from the "All Other BCAS" column of the RAR.

Coding

0=No complement to be deleted
1–12=Not assigned
13=Don't turn left
14=Don't turn right
15=Not assigned

Note.—In RAR Request Messages and BCAS Resolution Messages transmitted by Active BCAS, horizontal resolution is not used and DR2 is set to all zeroes. This field is defined to provide for future versions of BCAS which may use horizontal resolution (e.g., Full BCAS).

UDS: U-Definition Subfield, 8 bits, 33 through 40. Defines the data content and coding in the remainder of MU. For convenience in coding, UDS is expressed in two groups of 4 bits each, UDS1, 33 through 36, and UDS2, 37 through 40. UDS1 defines the destination of the MU message and UDS2 defines the specific message type. The ATARS avionics is the destination for long special surveillance interrogation MU Messages containing the UDS1=3 code in MU.

RAR Request Messages and BCAS Resolution Message are identified by UDS=3 and UDS2=1, the combination of which is equivalent to UDS=49.

Note.—*Structure of MU for an RAR Request Message and BCAS Resolution Message*

Position	Number of bits	Subfield	Remarks
33–36	4	UDS1	=3.
37–40	4	UDS2	=1.
41	1	LCK	
42	1	MTB	
43–46	4	DR1	
47–50	4	AR1	
51–54	4	DR2	
55–58	4	AR2	
59–64	6		Not assigned.
65–88	24	DID	

The LCK, MTB, and DID subfields are defined in ref. B: 3.3.2.7.1 and are not ATARS-related.

3.3.2.5 MV Message, Special Reply.

ATARS-equipped aircraft use the MV field (3.3.1.6) of a long special surveillance reply to transmit an RAR Reply Message to BCAS and an RAR Busy Message to BCAS.

3.3.2.5.1 Subfields in MV for an RAR Reply Message to BCAS.

The technique for encoding the RAR Reply Message to BCAS is described in 4.3.1. The following subfields appear in MV for an RAR Reply Message to BCAS and are ATARS-related.

Note.—The structure and content of the RAR Reply Message to BCAS parallels that of the RAR Reply Message to ATARS (3.3.2.3.1).

HO1: RAR Column 1 Horizontal Advisories, 3 bits, 41 through 43. This subfield is as defined in 3.3.2.3.1.

HO2: RAR Column 2 Horizontal Advisories, 3 bits, 49 through 51. This subfield is as defined in 3.3.2.3.1.

HO3: RAR Column 3 Horizontal Advisories, 3 bits, 57 through 59. This subfield is as defined in 3.3.2.3.1.

HO4: RAR Column 4 Horizontal Advisories, 3 bits, 65 through 67. This subfield is as defined in 3.3.2.3.1.

HO5: RAR Column 5 (Own BCAS Column) Horizontal Advisories, 3 bits, 73 through 75. This subfield is as defined in 3.3.2.3.1.

HO6: RAR Column 6 Horizontal Advisories, 3 bits, 81 through 83. This subfield is as defined in 3.3.2.3.1.

VDS: V-Definition Subfield, 8 bits, 33 through 40. Defines the data content and coding in the remainder of MV. For convenience in coding, VDS is expressed in two groups of 4 bits each, VDS1, 33 through 36, and VDS2, 37 through 40. VDS1 defines the source of the MV message and VDS2 defines the specific message type from that source. The ATARS avionics is a source of long special surveillance reply MV messages containing the VDS1=3 code in MV.

An RAR Reply Message to BCAS is identified by VDS1=3 and VDS2=0, the combination of which is equivalent to VDS=48.

VE1: RAR Column 1 Vertical Advisories, 5 bits, 44 through 48. This subfield is as defined in 3.3.2.3.1.

VE2: RAR Column 2 Vertical Advisories, 5 bits, 52 through 56. This subfield is as defined in 3.3.2.3.1.

VE3: RAR Column 3 Vertical Advisories, 5 bits, 60 through 64. This subfield is as defined in 3.3.2.3.1.

VE4: RAR Column 4 Vertical Advisories, 5 bits, 68 through 72. This subfield is as defined in 3.3.2.3.1.

VE5: RAR Column 5 (Own BCAS Column) Vertical Advisories, 5 bits, 76 through 80. This subfield is as defined in 3.3.2.3.1.

VE6: RAR Column 6 Vertical Advisories, 5 bits, 84 through 88. This subfield is as defined in 3.3.2.3.1.

Note 1.—Structure of MV for an RAR reply message to BCAS.

Structure of MV for an RAR Reply Message to BCAS

Position	Number of bits	Subfield	Remarks
33–36	4	VDS1	=3.
37–40	4	VDS2	=0.
41–43	3	HO1	
44–48	5	VE1	
49–51	3	HO2	
52–56	5	VE2	
57–59	3	HO3	
60–64	5	VE3	
65–67	3	HO4	
68–72	5	VE4	
73–75	3	HO5	
76–80	5	VE5	
81–83	3	HO6	
84–88	5	VE6	

Note 2.—An RAR Reply Message to BCAS with all HOx and VEx subfields containing all zeroes indicates an empty RAR.

3.3.2.5.2 Subfields in MV for an RAR Busy Message to BCAS

VDS: V-Definition Subfield, 8 bits, 33 through 40 (3.3.2.4.1). An RAR Busy Message to BCAS is identified by VDS1=3 and VDS2=1, the combination of which is equivalent to VDS=49.

Note.—*Structure of MV for RAR Busy Message to BCAS*

Position	Number of bits	Subfields	Remarks
33–36	4	VDS1	=3.
37–40	4	VDS2	=1.
41–88	48		=Not assigned.

The structure of the MV field for an RAR Busy Message to BCAS is identical to the

structure of the MB field for an RAR Busy Message to ATARS (3.3.2.3.2).

3.3.2.6 SL BCAS Sensitivity Level Report.

Downlink, 3 bits, 10 through 12. Appears in short special surveillance reply, DF=0. This field is always set to all zeroes by ATARS-only aircraft.

3.3.2.7 UM Utility Message

Airborne ATARS equipment use the UM field (3.3.1.9) to transmit to ground ATARS equipment a pilot request for an altitude echo advisory.

3.3.2.7.1 Subfield in UM for ATARS.

The following subfield appears in UM for ATARS.

AER: Altitude Echo Request Bit, 1 bit, 14.

Coding

0=No pilot request for an altitude echo advisory
1=Pilot request for an altitude echo advisory

Note.—A summary of the complete subfield structure for UM for ATARS is given in 3.3.1.9.

4. Protocol

4.1 Protocol for ATARS Class O Service

This section describes the protocols under which ATARS advisories for Class O users are uplinked and the relevant rules for structuring the ATARS messages for this class using the subfields described in Section 3. In addition, the protocol governing the downlinking at ATARS Extended Data from Class O users is described.

4.1.1 Packet Structure for Class O Service

The set of all ATARS messages generated by a single ATARS site for an aircraft on a given complete update is call a *packet.* For Class O service a packet consists of 1 or 2 Comm-A uplink messages using the Class O formats as listed in Table 3.3–2.

Note.—BCAS-equipped aircraft may receive ATCRBS Track Block Messages (ref. B: 4.4.1) in addition to the above messages.

If a resolution advisory is contained in the packet, then the first message is the ATARS Resolution Message. Otherwise, the first message is the Three Advisories Message. In either case, if the number of ATARS advisories to be transmitted in the packet exceeds the capacity of the first message, then the remaining advisories will be formatted into the Six Advisories Message.

For Class O service, a packet is complete after either 1) a Six Advisories Message is received, 2) 0.1 seconds has elapsed since receipt of the first message of the packet, or 3) an ATARS message containing a null advisory is received. The ATARS output device is to be updated with the packet within 1.0 second of the time the packet is complete.

4.1.1.1 Priority Ordering.

All advisories within an ATARS message are priority ordered by the ground ATARS equipment with the adviosry inserted into the first data subfield to be transmitted having the highest priority and each subsequent advisory lesser priority.

ATARS messages within a single packet are ordered in terms of priority by ATARS and are forwarded to the DABS sensor for delivery in order of ATARS priority.

Note.—This results in messages being transmitted in order of ATARS priority. Failure to receive a technical acknowledgement from the intended recipient aircraft will result in re-transmission of the unacknowledged message prior to transmission of next (lower priority) message. Thus, if for any reason the DABS sensor is able to deliver only a portion of the complete packet, the messages with higher priorities will have been delivered.

4.1.1.2 Limitation on Number of Advisories in each Packet.

If the ground ATARS logic generates more ATARS advisories than can be inserted into one packet, the lower priority advisories will not be uplinked.

Note.—This means that for Class O, a maximum of 9 ATARS advisories can be uplinked. When there is a resolution advisory, a maximum of 8 ATARS traffic and auxiliary advisories can be uplinked (in addition to the resolution advisory). Future classes of ATARS are not necessarily constrained by these limits.

4.1.2 Protocol for Uplinking ATARS Advisories

4.1.2.1 ATARS Sites at which Advisories May Originate.

Resolution advisories originate at any ground ATARS site that has assumed responsibility for the particular conflict. ATARS traffic advisories and ATARS auxiliary advisories originate only at the ground ATARS site that has been designated as primary for the aircraft.

4.1.2.2 Resolution Advisory Protocols.

Each message packet contains at most one ATARS Resolution Message which specifies the ATARS resoultion resulting from all the conflicts for which the sensor is responsible. Resolution advisories are uplinked to ATARS equipped aircraft by the responsible DABS/ATARS site(s) on each update cycle in which ground ATARS logic determines that criteria for resolution have been satisfied.

4.1.2.2.1 Protocol for Clearing Commands.

After each period of time in which commands form a site are active (i.e., COL=O), that site will generate an ATARS Resolution Message with COL=O to delete all command from the site. When COL=O, any traffic advisory contained in the TRA subfield is no longer associated with resolution advisorties, and can be determined to be proximity or threat advisory using the TPIN subfield.

4.1.2.3 Traffic Advisory Protocols.

The primary DABS/ATARS site uplinks a traffic advisory to an ATARS equipped aircraft on each update cycle in which ground ATARS equipment determines the incounter aircraft to have satisfied criteria for advisory issuance. The traffic advisory is formatted as either a proximity advisory or threat advisory in accordance with criteria established by ground ATARS equipment. When an ATARS Resolution Message is generated by the primary sensor, the associated TRA subfield contains a traffic advisory for the most critical threat which is causing the resolution advisory. If the ATARS Resolution Message is generated by a DABS/ATARS site which is not primary, then the associated TRA and TPA subfields will not contain any advisories.

4.1.2.4 Altitude Echo Advisory Protocols.

An altitude echo advisory is uplinked by the primary DABS/ATARS site:

(1) upon initiation of ATARS service,
(2) when requested by the pilot, and
(3) periodically while the aircraft is within the ATARS service volume.

A pilot request for an altitude echo advisory is indicated by setting AER=1 in the UM field for ATARS. The protocol for downlinking this field is described in ref. A: 4.18.2.2. The altitude echo advisory is formatted into an 18 bit AEE Subfield.

4.1.2.5 Terrain Advisory Protocols.

A terrain advisory is uplinked by the primary DABS/ATARS site on each update cycle in which ATARS determines the aircraft to be in potential conflict with the terrain. A terrain advisory is formatted into an 18 bit TAE Subfield or a 12 bit TEA Subfield.

4.1.2.6 Obstruction Advisory Protocols.

An obstruction advisory is uplinked by the primary DABS/ATARS site on each update cycle in which ATARS determines the aircraft to be in potential conflict with an obstruction. An obstruction advisory is formatted into the 18 bit OAE Subfield or a 12 bit OBA Subfield.

4.1.2.7 Restricted Airspace Advisory Protocols.

A restricted airspace advisory is uplinked by the primary DABS/ATARS site on each update cycle in which ATARS determines that the aircraft is within a region of airspace not known by ATARS to be authorized for that aircraft. A restricted airspace advisory is formatted into an 18 bit RAE Subfield or a 12 bit RAA Subfield.

4.1.3 Protocol for Downlinking ATARS Extended Data

The ATARS Extended Data Subfield is requested by the ground ATARS equipment when ATARS service is first initiated. This request is communicated to the airborne ATARS equipments using the extended data readout protocol specified in ref. A: 4.11.1; 4.11.1.1. Specifically, upon receipt of a surveillance or Comm-A interrogation, UF=4, 5, 20, or 21, with RR=19, DI=7, and RRS=2 in the associated SD field, the airborne ATARS equipment responds with an ATARS Extended Data Message in the corresponding Comm-B reply.

4.2 Protocol for ATARS Class 1 and 2 Services

This section describes the protocols under which ATARS advisories for Class 1 and 2 users are to be uplinked and the relevant rules for structuring the ATARS messages for these classes using the subfields described in Section 3. In addition, the protocol governing the downlinking of ATARS Extended Data from Class 1 and 2 users is described.

4.2.1 Packet Structure for Classes 1 and 2 Service

The set of all ATARS messages generated by a single ATARS site for a given aircraft on a complete update is called a *packet*. For Class 1 and 2 service, a packet consists of one or more Comm-A uplink messages using the Class 1 and 2 formats as listed in Table 3.3–2.

Note.—BCAS-equipped aircraft may receive ATCRBS Track Block Messages (ref. B: 4.4.1) in addition to the above messages.

For Class 1 and 2 service, a packet is complete when 0.1 seconds has elasped since receipt of the first message in a packet. The ATARS output device is to be updated with the packet within 1.0 seconds of the time the packet is complete.

4.2.1.1 Priority Ordering.

For Class 1 and 2 service, all advisory subfields within a single packet are ordered in terms of ATARS priority by the ground ATARS equipment with the advisory inserted into the first transmitted subfield having the highest priority and each subsequent advisory lesser priority. For Class 1 and 2 the TRA and TPA subfields in the ATARS Resolution Message are formatted according to protocols for ATARS Class 0. The information in these subfields is largely redundant with more complete information in the PDT subfields which will be transmitted later in the same packet. This use of the TRA and TPA subfields does not affect the number or ordering of the 24 bit subfields.

All messages within a single packet are ordered in terms of ATARS priority as determined by the ground ATARS equipment and are then forwarded to the DABS ground equipment for delivery in order of ATARS priority.

Note.—This results in messages being transmitted in order of ATARS priority. Failure to receive a technical acknowledgement from the intended recipient aircraft will result in re-transmission of the message prior to transmission of the next (lower priority) message. Thus, if for any reason the DABS ground equipment is able to deliver only a portion of the complete packet, the messages with higher priority will have been delivered. The first advisory received by the aircraft is the most critical.

4.2.1.2 Limitation on Number of Traffic Advisories in Each Packet.

In a given packet, traffic advisory information is limited to only those encounter aircraft associated with the active track numbers.

Note.—This limits the maximum number of encounter aircraft associated with the packet to eight for Classes 1 and 2. Track assignments for future classes of ATARS are not constrained by these assignments.

4.2.1.2.1 Track Number Assignment.

Once a track is activated, the track number utilized by a sensor will remain associated with the same encounter aircraft until that aircraft is dropped from the packet.

4.2.1.2.2 Track Handoff.

The handoff procedures for transferring ATARS responsibility from one sensor to another will provide for continuity in track assignments only for threat encounters that have a conflict table stored in the ground ATARS computer (i.e., encounters identified as requiring resolution advisories). Continuity in track assignments during handoff is not provided for other encounters.

4.2.2 Protocol for Uplinking ATARS Advisories

The criteria for the issuance of traffic advisories, resolution advisories and auxiliary advisories to Class 1 and 2 users by ground ATARS equipment are the same as for Class 0 users. This section describes the protocol associated with uplinking each of the data subfields which are used in providing Class 1 and 2 services by the primary ATARS site. The locations of the data subfields within the ATARS uplink messages are presented in Table 3.3–2.

4.2.2.1 Protocol for ODS, Own Data Subfield.

The Own Data Subfield (ODS) is not uplinked for Class 1 service. For Class 2 service, the Own Data Subfield is scheduled 1) upon initiation of ATARS service and 2) whenever an active track exists and the previous own data is obsolete according to error tolerances established in the ground ATARS equipment.

4.2.2.2 Protocol for PDT, Position Data Subfield.

For Class 1 and 2 service, each packet contains one Position Data Subfield (PDT) for each active track.

4.2.2.3 Protocol for SED, Start/End Data Subfield.

The Start/End Data Subfield (SED) is not uplinked for Class 1 service. For Class 2 service a Start/End Data Subfield is scheduled whenever a track is initiated for a proximate aircraft. This subfield is also uplinked whenever a track, either proximate or threat, is terminated. However, if all eight track numbers are in use and another encounter aircraft is detected, the ground sensor will reassign the track number of the lowest ranking encounter to the new higher ranking encounter aircraft without sending s Start/End Data Subfield to terminate the lower ranking encounter track. The Start/End Subfield uplinked to initiate the new track will then serve to terminate the old track with the same track number.

4.2.2.4 Protocol for STD, Start Threat Data Subfield.

The Start Threat Data Subfield (STD) is not uplinked for Class 1 service. For Class 2 service one Start Threat Data Subfield is scheduled whenever a threat track is initiated, and either no Start/End Data Subfield was previously transmitted to start the track or the information contained in the Start/End Data Subfield previously transmitted is obsolete.

4.2.2.5 Protocol for THD, Threat Data Subfield.

For Class 1 and 2 service, one Threat Data Subfield (THD) is scheduled in each packet for each active track with a threat status. The Position Data Subfield (PDT) of the Threat Message is associated with the aircraft described by the THD subfield in the same message.

4.2.2.6 Protocol for AEC, Altitude Echo Advisory Subfield

The Altitude Echo Advisory Subfield (AEC) is scheduled for uplink

(a) upon initiation of ATARS service

(2) when requested by the pilot

(3) periodically while the aircraft is within the ATARS service volume.

A pilot request for an altitude echo advisory is indicated by setting AER=1 in the UM field for ATARS. The protocol for downlinking this field is described in ref. A: 4.18.2.2.

4.2.2.7 Protocol for TER, Terrain Advisory Subfield

For Class 1 and 2 service, the Terrain Advisory Subfield (TER) is uplinked by the primary DABS/ATARS site on each update cycle in which ground ATARS equipment determines the aircraft to be in potential conflict with the terrain.

4.2.2.8 Protocol for OBT, Obstruction Advisory Subfield

For Class 1 and 2 service, Obstruction Advisories Subfields (OBT) are scheduled only by the primary DABS/ATARS site. One OBT is scheduled for each obstruction on each update cycle in which ground ATARS equipment determines that a potential conflict with that obstruction exists. A maximum of three obstruction advisories can be uplinked in the Auxiliary Advisories Message with RST=0. One obstruction advisory can be uplinked in the Auxiliary Advisories Message with RST=1.

4.2.2.9 Protocol for RTD, Restricted Airspace Advisory Subfield

For Class 1 and 2 service, the Restricted Airspace Advisory Subfield (RTD) is uplinked by the primary DABS/ATARS site on each update cycle in which ATARS determines the aircraft to be within a region of restricted airspace not known by ATARS to be authorized for own aircraft. RTD is contained in the Auxiliary Advisories Message with RST=1.

4.2.3 Protocol for Downlinking ATARS Extended DATA

For Class 1 and 2 service, this protocol is the same as that defined in 4.1.3 for Class 0 service.

4.3 RAR Protocol

4.3.1 Coordination With BCAS

If an ATARS-equipped aircraft receives an RAR Request Message or a BCAS Resolution Message and its RAR is not locked, the aircraft locks its RAR, replies with an RAR Reply Message to BCAS, updates its RAR (5.3.1.2) and then unlocks its RAR. Otherwise, an RAR Busy Message to BCAS is transmitted.

The RAR Reply Message to BCAS contains an encoded image of each column of own RAR. The horizontal advisories of a column are encoded by scanning the "Left Component" list of Table 4.3–1 and selecting the first active (bit=1) advisory contained in the column, and then scanning the "Right Component" list of Table 4.3–1 and selecting

the first active advisory contained in the column. The two horizontal components thus selected are then encoded in accordance with 3.3.2.5.1. The vertical advisories of a column are encoded using the same technique employed for encoding horizontal advisories except that the "Up Component" and "Down Component" lists of Table 4.3–1 are scanned.

4.3.2 Coordination With Ground ATARS Equipment

4.3.2.1 Ground-Initiated Coordination

If the ATARS aircraft receives an interrogation, UF=4,5, 20 or 21, containing RR=19 and if the interrogation is not an ATARS Resolution Message, and if the RAR is not locked, then the aircraft transmits an RAR Reply Message to ATARS. If the RAR is locked, the RAR Busy Message to ATARS is transmitted.

If an ATARS-equipped aircraft receives an ATARS Resolution Message with its associated RAR downlink request (i.e., RR=19), and the RAR is not locked, the aircraft locks its RAR to deny access to all other users, transmits an RAR Reply Message to ATARS, updates the RAR (5.3.1.3), and unlocks the RAR. Otherwise, an RAR Busy Message to ATARS is transmitted.

The RAR Reply Message to ATARS contains an encoded image of each column of own RAR. The horizontal and vertical advisories of each column are encoded using the technique employed for the RAR Reply Message to BCAS (4.3.1).

4.3.2.2 Air-Initiated Coordination

The ATARS avionics provides an indication whenever its RAR is not empty, i.e., whenever one or more bits in the RAR are set to '1'. When a non-empty RAR exists, the DR field is set to 2 or 3 in a surveillance or Comm B reply, DF=4, 5, 20, or 21. DR=2 is used when the B bit (3.3.1.2) is not set. DR=3 is used when the B bit is also set.

4.4 Extended Capability Report

The presence of operating ATARS equipments on board an aircraft causes the CA=2 code (extended capability) to be set in all DABS All-Call replies, DF=11, to the ground sensor (ref. A: 3.3.6). The ground sensor learns of the specific extended capabilities on board the aircraft by using the Extended Capability Report protocol specified in ref. A: 4.6.3. Airborne ATARS equipments cause the following codes to be set in the MB subfields of an Extended Capability Report Message.

Table 4.3–1.—*Hierarchy of Resolution Advisories*

Left component	Right component
Turn left	Turn right.
Don't turn right	Don't turn left.

Up component	Down component
Climb	Descend.
Don't Descend	Don't climb.
Don't descend faster than 500 fpm.	Don't climb faster than 500 fpm.
Don't descend faster than 1000 fpm.	Don't climb faster than 1000 fpm.
Don't descend faster than 2000 fpm.	Don't climb faster than 2000 fpm.

(1) ACS: bit 46 = 1 (ASA avionics); bit 48 = 1 (ASA avionics)

(2) ARC = 1 (ATARS only)

(3) ATA is set to the appropriate code (0 through 7) to indicate class of ATARS service which aircraft is requesting.

(4) ECS: bit 74 = 1 (ASA avionics)

4.5 Reply Protocol to BCAS Surveillance Interrogations

When an ATARS-equipped aircraft receives a short special surveillance interrogation, UF=0, from an airborne BCAS unit, the airborne ATARS equipment sets the following AR (ASA resolution Capability Report field) and SL (BCAS Sensitivity Level Report field) codes in the corresponding short special surveillance reply, DF=0.

(1) AR=1 (ATARS only)

(2) SL=0 (No BCAS sensitivity level reported).

Note.—Airborne BCAS units periodically transmit BCAS surveillance interrogations, UF=0, to all DABS-equipped aircraft in which BCAS determines that criteria for active surveillance have been satisfied.

5. Characteristics of Airborne ATARS Equipment

Note.—The functions of the airborne ATARS equipment were outlined in 1.4.2. This section defines specific characteristics which the airborne equipment must posses in order to perform those functions.

5.1 Elements of the Airborne ATARS Installation

The principal elements of the airborne ATARS installation are a DABS transponder, an altitude encoder, an ATARS avionics unit, and an output device for communicating ATARS advisories to the pilot.

Note.—This section describes these elements as separate functional entities, but in an actual ATARS installation, one or more of these elements may be integrated into a common avionics package.

5.2 DABS Transponder in the Airborne ATARS Installation

An ATARS airborne installation must include a DABS transponder with altitude encoding capability, the capability to handle DABS 112-bit uplink and downlink messages, and a real-time interface with the ATARS avionics unit.

5.3 Coordination of Resolution Advisories

A procedure is specified for coordination between adjacent ATARS sites to ensure that an ATARS-equipped aircraft does not receive conflicting resolution advisories from two ATARS sites, or that an ATARS site does not issue a resolution advisory contrary to a posted BCAS escape maneuver. This coordination procedure utilizes the RAR information downlinked (via an RAR Reply Message to ATARS) to each ground ATARS site.

5.3.1 Resolution Advisory Register (RAR)

The RAR is the interface for coordinating resolution advisories among ATARS-equipped aircraft, BCAS-equipped threats and ground ATARS equipments. The RAR contents are illustrated in Figure 5.3–1. The RAR stores all current resolution advisories by source using a single bit to indicate which advisory components have been established by which source.

5.3.1.1 RAR Access.

Access to the RAR is limited to one user at a time. This user may be a threat BCAS or ground ATARS equipment. To ensure that the RAR is not accessed while it is in the process of being updated, the RAR locks out all other users for the duration of the update.

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RAR BIT MATRIX
14 Rows and 6 Columns
1 = Advisory Active
0 = Advisory Not Active

	ATARS SITE A	ATARS SITE B	ATARS SITE C	ATARS SITE D	OWN BCAS*	ALL OTHER BCAS
CLIMB						
DON'T DESCEND						
DON'T DESCEND FASTER THAN 500 FPM						
DON'T DESCEND FASTER THAN 1000 FPM						
DON'T DESCEND FASTER THAN 2000 FPM						
DESCEND						
DON'T CLIMB						
DON'T CLIMB FASTER THAN 500 FPM						
DON'T CLIMB FASTER THAN 1000 FPM						
DON'T CLIMB FASTER THAN 2000 FPM						
TURN LEFT						
TURN RIGHT						
DON'T TURN LEFT						
DON'T TURN RIGHT						

*The bits in the "Own BCAS" column are always zero for an ATARS-only aircraft.

Fig. 5.3-1. Resolution Advisory Register (RAR) Bit Matrix Structure.

BILLING CODE 4910-13-C

5.3.1.2 Update RAR with Other BCAS Advisories.

The advisory complements received from BCAS aircraft in BCAS Resolution Messages are posted in the "All Other BCAS" column of the RAR (Fig. 5.3–1). If there is a complement to delete, a '0' is entered in the appropriate row of the RAR. If there is a complement to be added, a '1' is entered in the appropriate row of the RAR (if the bit is already set to '1' then the add operation refreshes it). If no bit in the "All Other BCAS" column has been refreshed and no bit has been added for an interval of 6 seconds, then all bits in the column are set to '0'.

5.3.1.3 Update RAR with ATARS Advisories.

The first step in updating the RAR with an ATARS Resolution Message received from ground ATARS equipment is to write all zeroes received in the COL Subfield directly into the appropriate rows of the RAR column associated with that ground ATARS equipment. Then, all advisory components set to '1' are tested against the contents of the RAR (all columns) for compatibility (Fig. 5.3–2). Any advisory component that is incompatible is not accepted. Any advisory component accepted is entered into the RAR as a '1' in the appropriate row. If the contents of any RAR ATARS column are not updated within 10 seconds, all bits in the column are set to '0'.

Note.—The ground ATARS equipment verifies acceptance of resolution advisories by performing a compatibility test upon the downlinked RAR contents.

5.3.2 Composite Resolution Advisory

To develop the composite resolution advisory for communication to the pilot, the ATARS avionics uses the resolution advisories stored in the first four columns of the RAR. A composite resolution advisory with up to four components is synthesized by selecting one or fewer advisories from each of the four lists in Table 4.3–1. An advisory, if any, is selected from each list by starting at the top of the list and selecting only the highest ranking advisory that appears in any one of the ATARS columns.

Note 1.—An example of a four-component resolution advisory is "Don't Climb, Don't Descend, Don't Turn Right, Don't Turn Left."

Note 2.—As described in ref. B, BCAS-equipped aircraft use resolution advisories stored in the first *five* columns of the RAR in developing the composite resolution advisory.

Note 3.—The "All Other BCAS" column (sixth column) is not used in synthesizing the composite resolution advisory.

BILLING CODE 4910-13-M

COMPATIBLE
RESOLUTION
ADVISORIES

1 = COMPATIBLE
0 = NOT COMPATIBLE

CURRENT RAR CONTENTS

COMPONENTS OF ADVISORY	CLIMB	DON'T DESCEND	DON'T DESCEND FASTER THAN 500 FPM	DON'T DESCEND FASTER THAN 1000 FPM	DON'T DESCEND FASTER THAN 2000 FPM	DESCEND	DON'T CLIMB	DON'T CLIMB FASTER THAN 500 FPM	DON'T CLIMB FASTER THAN 1000 FPM	DON'T CLIMB FASTER THAN 2000 FPM	TURN LEFT	TURN RIGHT	DON'T TURN LEFT	DON'T TURN RIGHT
CLIMB	1	1	1	1	1	0	0	0	0	0	1	1	1	1
DON'T DESCEND	1	1	1	1	1	0	1	1	1	1	1	1	1	1
DON'T DESCEND FASTER THAN 500 FPM	1	1	1	1	1	0	1	1	1	1	1	1	1	1
DON'T DESCEND FASTER THAN 1000 FPM	1	1	1	1	1	0	1	1	1	1	1	1	1	1
DON'T DESCEND FASTER THAN 2000 FPM	1	1	1	1	1	0	1	1	1	1	1	1	1	1
DESCEND	0	0	0	0	0	1	1	1	1	1	1	1	1	1
DON'T CLIMB	0	1	1	1	1	1	1	1	1	1	1	1	1	1
DON'T CLIMB FASTER THAN 500 FPM	0	1	1	1	1	1	1	1	1	1	1	1	1	1
DON'T CLIMB FASTER THAN 1000 FPM	0	1	1	1	1	1	1	1	1	1	1	1	1	1
DON'T CLIMB FASTER THAN 2000 FPM	0	1	1	1	1	1	1	1	1	1	1	1	1	1
TURN LEFT	1	1	1	1	1	1	1	1	1	1	1	0	0	1
TURN RIGHT	1	1	1	1	1	1	1	1	1	1	0	1	1	0
DON'T TURN LEFT	1	1	1	1	1	1	1	1	1	1	0	1	1	1
DON'T TURN RIGHT	1	1	1	1	1	1	1	1	1	1	1	0	1	1

Fig. 5.3-2. ATARS Advisory Compatibility.

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Appendix A.—*Comprehensive Index of Fields*

This index lists in alphabetical order all essential fields, mission fields, three-character designator subfields and four-character designator subfields for which coding is given in this Standard. The "Location" column indicates the mission field or three-character designator subfield in which the three-character or four-character designator subfield listed under the "Designator" column appears. Content of all four-character designator subfields can be found by referring to the three-character subfields in which they appear. If a four-character designator subfield appears in more than one three-character designator subfield then its content can be found by referring to the italized three-character designator subfield.

Designator	Downlink uplink	Name	Location	References	
				Content	Protocol
ACAB	U	Aircraft Abbreviated Data.	*SED*, STD		
ACS	D	A-Capability	MB	3.3.1.4.2	4.4
ADS	U	A-Definition Subfield	MA	3.3.1.3.1	
ADS1	U	A-Definition Subfield 1	ADS		
ADS2	U	A-Definition Subfield 2	ADS		
AEAL	U	Altitude Echo	*AEC*, AEE		
AEC	U	Altitude Echo Advisory Subfield.	MA	3.3.2.2.1	4.2.2.6
AECA	U	Adjusted Altitude Bit	*AEC*, AEE		
AECC	U	Reported Altitude Confidence Level.	*AEC*, AEE		
AEE	U	18 Bit Altitude Echo Advisory Subfield.	MA	3.3.2.2.2	
AER	D	Altitude Echo Request	UM	3.2.2.7.1	4.2.2.6
AEXT	U	Relative Altitude Extension.	THD		
ALRL	U	Fine Relative Altitude	*PDT*		
ALRZ	U	Fine Relative Altitude for Class 0.	*TPE*, TRA		
ALUN	U	Altitude Unknown Indicator.	TPA	3.3.2.2.21	
ALZN	U	Relative Altitude Zone	*PDT*, TPE, TRA		
ALZZ	U	Relative Altitude Zone for Class 0.	SIX		
AP	U/D	Address/Parity		3.2.2.1	
AR	D	ASA Resolution Capability Report.			4.5
AR1	U	Add Vertical Resolution Advisory.	MU	3.3.2.4.1	
AR2	U	Add Horizontal Resolution Message.	MU	3.3.2.4.1	
ARC	D	ASA Resolution Capability.	MB	3.3.2.3.4	
ARHT	U	Altitude Relative to Highest Terrain.	*TAE*, TAS		
ARTO	U	Altitude Relative to Obstruction.	*OAE*, OAS, OBT		
ASID	U	Restricted Airspace Identifier.	*RTD*		
ASPT	U	Airspace Type	*RAA*, RAE		
ATA	D	ATARS Service Class	MB	3.3.2.3.4	
ATCC	U	ATC Control	*PDT*, TRA		
BDS	D	B-Definition Subfield	MB	3.3.1.4.1	
BDS1	D	B-Definition Subfield 1	BDS		
BDS2	D	B-Definition Subfield 2	BDS		
CA	D				4.4
COL	U	ATARS Resolution Advisory Column.	MA	3.3.2.2.3	4.1.2.2.1
CLBR	U	Clock Bearing	*OAE*, OAS, OBT, PDT, SIX, TRA.		
CLM	D	Aircraft Climb Performance Capability.	MB	3.3.2.3.3.	
CONT	U	Continuation	STD		
CRSE	U	Compass Course	*PDT*, TPA, TPE, TRA		
CZSI	U	Class Zero Subfield Indicator.	*OAS*, RAA, TAS, TPA TPE.		
DF	D	Downlink Format		3.2.2.1	
DI	U	Designator, Identification.		3.3.1.1	4.1.3
DR	D	Downlink Request	MB	3.3.1.2	4.3.2.2
DR1	U	Delete Vertical Resolution Advisory.	MU		
DR2	U	Delete Horizontal Resolution Advisory.	MU	3.3.2.4.1	
DUMI	U	Dummy Indicator	AES		
ECS	D	Extended Capability	MB	3.3.1.4.2	4.4.
FNBR	U	Fine Bearing	PDT		
FNHD	U	Fine Heading	THD		
FTAT	U	First Time Advisory Transmitted.	*OAE*, OAS, OBT, PDT, RAA, RAE, TAE, TAS, TPA, TPE.		
GSPD	U	Groundspeed	*SED*, STB		
H01	D	RAR Column 1 Horizontal Adv.	MB, MV	3.3.2.3.1	
H02	D	RAR Column 2 Horizontal Adv.	MB, MV	3.3.2.3.1	

Designator	Downlink uplink	Name	Location	References	
				Content	Protocol
H03	D	RAR Column 3 Horizontal Adv.	MB, MV	3.3.2.3.1	
H04	D	RAR Column 4 Horizontal Adv.	MB, MV	3.3.2.3.1	
H05	D	RAR Column 5 Horizontal Adv.	MB, MV	3.3.2.3.1	
H06	D	RAR Column 6 Horizontal Adv.	MB, MV	3.3.2.3.1	
MA	U	Message, Comm-A			
MB	D	Message, Comm-B			
MU	U	Message, Special Interrogation.			
MV	D	Message, Special Reply			
OACL	U	Own ATARS Class	ODS		
OAE	U	18 Bit Obstruction Advisory Subfield.	MA	3.3.2.2.4	4.1.2.6
OBA	U	12 Bit Obstruction Advisory Subfield.	MA	3.3.2.2.5	4.1.2.6
OBT	U	13 Bit Obstruction Advisory Subfield.	MA	3.3.2.2.6	4.2.2.8
ODS	U	Own Data Subfield	MA	3.3.2.2.7	4.2.2.1
OGTC	U	Own Ground Track Course.	ODS		
OSPD	U	Own Groundspeed	ODS		
OTNR	U	Own Ground Track Turn Rate.	ODS		
PDT	U	Position Data Subfield	MA	3.3.2.2.8	4.2.2.3
PHMD	U	Predicated Horizontal Miss Distance.	THD		
RAA	U	12 Bit Restricted Airspace Advisory Subfield.	MA	3.3.2.2.9	4.1.2.7
RAE	U	18 Bit Restricted Airspace Advisory Subfield.	MA	3.3.2.1.10	4.1.2.7
RESL	U	Resolution Advisory Bit	THD		
RNGE	U	Range	*PDT*, TPE, TRA		
RNGO	U	Range to Obstruction	OBT		
RR	U	Reply Request			4.1.3
RRS	U	Reply Request	SD	3.3.1.8.1	4.1.3
RST	U	1 Bit Restricted Airspace Status.	MA	3.3.2.2.11	
RTD	U	26 Bit Restricted Airspace Advisory Subfield.	MA	3.3.2.2.12	4.2.2.9
SED	U	START/End Data Subfield.	MA	3.3.2.2.13	4.2.2.4
SEIN	U	Start/End Indicator	SED		
SIT	U	ATARS Site ID Code	MA	3.3.2.2.14	
SIX	U	6 Bit Advisory Subfield	MA	3.3.2.2.15	
SL	D	BCAS Sensitivity Level Report.			4.5
SNIN	U	Sensor Initiation Bit	ODS		
STD	U	Start Threat Data Subfield.	MA	3.3.2.2.16	
SUBN	U	Subfield Indicator	*AEE*, OAE, RAE, TAE		
TAE	U	18 Bit Terrain Advisory Subfield.	MA	3.3.2.2.17	
TEA	U	12 Bit Terrain Advisory Subfield.	MA	3.3.2.2.18	4.1.2.5
TER	U	8 Bit Terrain Advisory Subfield.	MA	3.3.2.2.19	4.2.2.7
THD	U	Threat Data Subfield	MA	3.3.2.2.20	4.2.2.5
TNTY	U	Turn Type of Threat	THD		
TPA	U	12 Bit Threat/Proximity Advisory Subfield.	MA	3.3.2.2.21	4.1.2.3, 4.2.1.1
TPE	U	18 Bit Threat/Proximity Advisory Subfield.	MA	3.3.2.2.22	
TPIN	U	Threat/Proximity Indicator.	*TPA*, TPE, TRA		
TRA	U	Threat/Proximity with Resolution Advisory Subfield.	MA	3.3.2.2.23	4.1.2.3, 4.2.1.1
TRKN	U	Track Number	*SED*, STD, THD		4.2.1.2.1
UDS	U	U-Definition Subfield	MA	3.3.2.4.1	
UDS1	U	U-Defintion Subfield 1	UDS		
UDS2	U	U-Defintion Subfield 2	UDS		
UF	U	Uplink Format		3.2.2.1	
UM	D	Utility Message		3.3.1.9	4.1.2.4
VDS	D	V-Definition Subfield	MV	3.3.2.5.2	
VDS1	D	V-Definition Subfield 1	VDS		
VDS2	D	V-Definition Subfield 2	VDS		
VE1	D	RARColumn 1 Vertical Advisories.	MB, MV	3.3.2.3.1	
VE2	D	RARColumn 2 Vertical Advisories.	MB, MV	3.3.2.3.1	
VE3	D	RARColumn 3 Vertical Advisories.	MB, MV	3.3.2.3.1	
VE4	D	RARColumn 4 Vertical Advisories.	MB, MV	3.3.2.3.1	

Designator	Downlink uplink	Name	Location	References	
				Content	Protocol
VE5	D	RARColumn 5 Vertical Advisories.	MB, MV	3.3.2.3.1	
VE6	D	RARColumn 6 Vertical Advisories.	MB, MV	3.3.2.3.1	
VSPD	U	Vertical Speed of Threat.	THD		

Appendix B.—*Summary of Principal DABS Control Fields Used by ASA Systems*

[National Aviation Standard References: A=DABS, B=Active BCAS, C=ATARS]

ADS Subfield in Comm A Message

ADS1 (A-sink)	ADS2 (message type)	ADS	Type	Principal references
1	0–1	16–17	ATARS Class 0 Advisories	C:3.3.2.2.
1	3	19	ATCRBS Track Block	B:3.3.2.3.2.
1	7	23	ATARS Class 1 and 2 Auxiliary Advisories	C:3.3.2.2.
1	8–15	24–31	ATARS Class 1 and 2 Traffic Advisories	C:3.3.2.2.
3	0	48	ATARS Resolution Message	C:3.3.2.2.

BDS Subfield in Comm B Message

BDS1 (B-source)	BDS2 (message type)	BDS	Type	Principal references
1	0	16	Extended Capability Report	C:3.3.1.4.2.
3	0	48	RAR Reply Message to ATARS	C:3.3.2.3.1.
3	1	49	RAR Busy Message to ATARS	C:3.3.2.3.2.
3	2	50	ATARS Extended Data	C:3.3.2.3.3.

Uplink Data Requests

Type	Field/subfield values	Principal references
RAR	RR=19, DI≠7	C:4.3.2.1.
ATARS Extended Data	RR=19, DI=7, RRS=2	C:4.1.3; C:4.2.3.

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